

FINAL

**ENGINEERING EVALUATION/COST ANALYSIS FOR  
INSTALLATION RESTORATION SITE 6  
MARINE CORPS AIR GROUND COMBAT CENTER  
TWENTYNINE PALMS, CALIFORNIA**



Contract No. N47408-01-D-8207  
Task Order No. 0028

Prepared for



**Southwest Division  
Naval Facilities Engineering Command  
1220 Pacific Highway  
San Diego, California 92132**



**Marine Corps Air Ground Combat Center  
Twentynine Palms, California**

Prepared by

 **Battelle**  
... Putting Technology To Work  
505 King Avenue  
Columbus, Ohio 43201

October 2002

# **FINAL**

## **Engineering Evaluation/Cost Analysis For Installation Restoration Site 6 Marine Corps Air Ground Combat Center Twentynine Palms, California**

**October 2002**

Approved: \_\_\_\_\_  
Lance Smith  
Southwest Division Naval Facilities Engineering Command  
Remedial Project Manager  
Date \_\_\_\_\_

Approved: \_\_\_\_\_  
Keith A. Fields, RCE# C59888  
Battelle Memorial Institute  
Project Engineer  
Date \_\_\_\_\_

Approved: \_\_\_\_\_  
Mark E. Kelley  
Battelle Memorial Institute  
Project Risk Assessor  
Date \_\_\_\_\_

## EXECUTIVE SUMMARY

This Engineering Evaluation/Cost Analysis (EE/CA) was performed in accordance with current United States Environmental Protection Agency (EPA) and U.S. Navy guidance documents for a non-time critical removal action under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and Chapter 6.8 of the California Health and Safety Code (Ca-HSC). This EE/CA summarizes the results of the EE/CA process, characterizes the site, identifies removal action objectives, describes removal action alternatives, contains analyses of these alternatives, and describes the recommended removal action alternative.

Installation Restoration (IR) Site 6 is a 40-acre residential area located in the southeastern part of the Mainside area in the Marine Palms housing area at Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms, CA. In preparation for demolition and replacement of Base housing, a Removal Site Evaluation (RSE) was conducted in 2001. As part of the RSE, soil samples were collected and analyzed for polychlorinated biphenyls (PCBs), total petroleum hydrocarbons (TPH), pesticides, metals, volatile organic compounds (VOCs), and semivolatile organic compounds (SVOCs). PCBs and TPH were widely and randomly detected across the entire site. The most likely source for both of these compounds is use of waste oil, including PCB-laden transformer oil, for dust control during past construction activities. It is important to note that Aroclor 1254 was the only PCB mixture identified at IR Site 6.

CERCLA, National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Part 300) and Ca-HSC §25323 define removal actions as the cleanup or removal of released hazardous substances, actions to monitor the threat of release of hazardous substances, and actions to mitigate or prevent damage to public health or welfare or the environment. The NCP includes provisions for the “removal of drums, barrels, tanks, or other bulk containers that contain or may contain hazardous substances or pollutants or contaminants where it will reduce the likelihood of spillage; leakage; exposure to humans, animals, or the food chain...”

The purpose of this EE/CA is to identify and analyze potential removal action alternatives to address the presence of PCBs in soil equal to or greater than 1 mg/kg at IR Site 6. Three alternatives were identified and considered:

- Alternative 1: Institutional controls;
- Alternative 2: Excavation and off-site disposal; and
- Alternative 3: No action.

Based on this analysis, the Navy recommends Alternative 2: Excavation and Off-Site Disposal. This alternative best meets the NCP criteria of overall protectiveness of human health, compliance with applicable relevant and appropriate requirements (ARARs), long-term effectiveness, reduction of mobility, toxicity, or volume through treatment, short-term effectiveness, implementability, cost, and state and community acceptance. This removal action is expected to achieve site restoration necessary for subsequent residential use by military personnel.

## CONTENTS

EXECUTIVE SUMMARY .....	iii
FIGURES .....	v
TABLES .....	vi
ACRONYMS AND ABBREVIATIONS .....	vii
Section 1.0: INTRODUCTION.....	1
Section 2.0: SITE CHARACTERIZATION .....	3
2.1 Site Description and Background.....	3
2.1.1 Site Location.....	3
2.1.2 Type of Facility and Operational Status .....	3
2.1.3 Structures and Topography .....	3
2.1.4 Geology/Soil Information .....	7
2.1.5 Surrounding Land Use and Populations .....	9
2.1.6 Sensitive Ecosystems.....	9
2.1.7 Meteorology.....	12
2.2 History of Previous Removal Actions, Investigations, and Activities .....	12
2.2.1 Brown and Caldwell, 1985 .....	13
2.2.2 Jacobs Engineering Group Inc., 1996.....	13
2.2.3 CDM Federal Programs Corporation, 1995.....	13
2.2.4 Environmental Chemical Corporation, 1997a .....	13
2.2.5 Environmental Chemical Corporation, 1997 .....	14
2.2.6 Battelle, 1999.....	14
2.2.7 Battelle, 2000.....	14
2.2.8 Battelle, 2001.....	14
2.3 Source, Nature, and Extent of Contamination.....	14
2.4 Analytical Data .....	19
2.4.1 Presentation of Analytical Data .....	19
2.4.2 Data Quality.....	19
2.5 Summary of Human Health Risk Assessment .....	19
2.5.1 Uncertainties Associated with Risk Estimates.....	20
2.5.2 Health Effects Associated with Chemicals of Concern and Threat to Nearby Human Populations and Environment .....	22
2.5.3 Documented Exposure Pathways.....	22
2.5.4 Sensitive Populations.....	22
2.6 Summary of Ecological Risk Assessment.....	23
Section 3.0: IDENTIFICATION OF REMOVAL ACTION OBJECTIVES.....	25
3.1 Statutory Framework.....	25
3.2 Determination of Removal Scope .....	26
3.3 Determination of Removal Schedule .....	26
3.4 Applicable or Relevant and Appropriate Requirements.....	26
3.4.1 ARARs Overview.....	26
3.4.2 ARARs Affecting Removal Action Objectives .....	27
3.5 Removal Action Objective.....	28
Section 4.0: IDENTIFICATION AND ANALYSIS OF REMOVAL ACTION ALTERNATIVES .....	29
4.1 Alternative 1: Institutional Controls.....	30
4.1.1 Description.....	30

## CONTENTS (Continued)

4.1.2	Effectiveness.....	30
4.1.3	Implementability.....	31
4.1.4	Cost.....	31
4.2	Alternative 2: Excavation and Off-Site Disposal.....	32
4.2.1	Description.....	32
4.2.2	Effectiveness.....	34
4.2.3	Implementability.....	36
4.2.4	Cost.....	36
4.3	Alternative 3: No Action.....	38
4.3.1	Description.....	38
4.3.2	Effectiveness.....	38
4.3.3	Implementability.....	38
4.3.4	Cost.....	38
Section 5.0:	COMPARATIVE ANALYSIS OF REMOVAL ACTION ALTERNATIVES.....	39
5.1	Effectiveness of Alternatives .....	39
5.2	Implementability of Alternatives .....	39
5.3	Cost of Alternatives.....	39
Section 6.0:	RECOMMENDED REMOVAL ACTION ALTERNATIVE .....	41
Section 7.0:	REFERENCES.....	42
APPENDIX A:	APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS.....	A-1

## FIGURES

Figure 2-1.	Location of Marine Corps Air Ground Combat Center .....	4
Figure 2-2.	Location of MCAGCC IR Site 6 .....	5
Figure 2-3.	Location of Former Percolation Ponds and Former Sludge Drying Beds at IR Site 6 .....	6
Figure 2-4.	Generalized Hydrogeologic Cross Section Showing Geology and Groundwater Elevations Across the Mesquite Lake Fault at Twentynine Palms MCAGCC.....	8
Figure 2-5.	Land Use in the Mainside Area .....	10
Figure 2-6.	Land Use Surrounding IR Site 6.....	11
Figure 2-7.	Extent and Concentration of Aroclor 1254 Detected at IR Site 6.....	16
Figure 2-8.	Extent and Concentration of Dieldrin Detected at IR Site 6.....	17
Figure 2-9.	Extent and Concentration of Chlordane Detected at IR Site 6 .....	18
Figure 3-1.	Removal Action Process at IR Site 6.....	25
Figure 4-1.	Proposed Areas for Soil Excavation .....	33
Figure 4-2.	Waste Management Flowchart .....	34

## TABLES

Table 1-1. Selection of Decision Documents.....	2
Table 2-1. Population Statistics for IR Site 6.....	12
Table 2-2. Sensitive Species Potentially Occurring at MCAGCC.....	12
Table 2-3. Previous Environmental Investigations .....	13
Table 2-4. Summary of Total Cancer Risks Based on the 95th Percentile Concentrations in Soil.....	21
Table 2-5. Summary of Total Noncancer Hazards Based on the 95th Percentile Concentrations in Soil.....	21
Table 2-6. Sources of Uncertainty in the Risk Assessment and Impact on Calculated Risks.....	22
Table 4-1. Summary of Costs for Alternative 1: Institutional Controls.....	31
Table 4-2. Waste Classification Levels.....	35
Table 4-3. Summary of Costs for Alternative 2: Excavation and Off-Site Disposal .....	37
Table 5-1. Comparison of Removal Action Alternatives.....	40

## ACRONYMS AND ABBREVIATIONS

AM	Action Memorandum
amsl	above mean sea level
ARAR	applicable or relevant and appropriate requirement
ATSDR	Agency for Toxic Substances and Disease Registry
BDAT	Best Demonstrated Available Technology
bgs	below ground surface
BMP	best management practice
Ca-HSC	California Health and Safety Code
Cal-EPA	California Environmental Protection Agency
CAX	Combined Arms Exercises
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
COPC	constituent of potential concern
DERP	Defense Environmental Restoration Program
DHS	Department of Health Services
DON	United States Department of the Navy
DTSC	California Department of Toxic Substances Control
ECC	Environmental Chemical Corporation
EE/CA	Engineering Evaluation/Cost Analysis
EO	Executive Order
FDA	Food and Drug Administration
FFA	Federal Facilities Agreement
HASP	Health and Safety Plan
IR	Installation Restoration
I&SE	Imminent and Substantial Endangerment
JEG	Jacobs Engineering Group, Inc.
LDR	land disposal restrictions
MCAGCC	Marine Corps Air Ground Combat Center
MCL	maximum contaminant level
MDAQMD	Mojave Desert Air Quality Management District
MRL	Method Reporting Limit
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFESC	Naval Facilities Engineering Service Center

O&M	operations and maintenance
OEHHA	Office of Environmental Health Hazard Assessment
OSHA	Occupational Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
PCB	polychlorinated biphenyl
PEF	particulate emission factor
ppm	parts per million
PQL	practical quantitation limit
PRG	Preliminary Remediation Goal
QA/QC	quality assurance/quality control
QC	quality control
RAP	Remedial Action Plan
RAW	Removal Action Workplan
RCRA	Resource Conservation and Recovery Act
RME	reasonable maximum exposure
RSE	removal site evaluation
RWQCB	Regional Water Quality Control Board (Colorado River Basin Region)
SARA	Superfund Amendments and Reauthorization Act
SI	Site Inspection
STLC	soluble threshold limit concentration
SVOC	semivolatile organic compound
SWDIV	Southwest Division Naval Facilities Engineering Command
TBC	to be considered
TCLP	toxicity characteristic leaching procedure
TPH	total petroleum hydrocarbons
TSCA	Toxic Substances Control Act
TSD	treatment, storage, and disposal
TTLC	total threshold limit concentration
UCL	upper confidence limit
USC	United States Code
U.S. EPA	United States Environmental Protection Agency
UTS	universal treatment standard
VF	volatilization factor
VOC	volatile organic compound



## Section 1.0: INTRODUCTION

This Engineering Evaluation/Cost Analysis (EE/CA) addresses Installation Restoration (IR) Site 6 at Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms, CA. This EE/CA has been prepared for United States Department of Navy (DON), Southwest Division Naval Facilities Engineering Command (SWDIV) under Task Order No. 0028 of the Naval Facilities Engineering Service Center (NFESC) Contract No. N47408-01-D-8207. IR Site 6 is a 40-acre residential area scheduled for redevelopment as base housing and is located within the Marine Palms Housing area.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) define removal actions to include, *“the cleanup or removal of released hazardous substances from the environment, such actions as may necessarily be taken in the event of the threat of release of hazardous substance into the environment, such action as may be necessary to monitor, assess and evaluate the release or threat of release of hazardous substances, the disposal of removal material, or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment, which may otherwise result from a release or threat of release.”* The United States Environmental Protection Agency (U.S. EPA) has classified three types of removal actions according to the circumstance surrounding the release or threat of release; emergency time-critical, and non-time-critical. The removal action proposed for IR Site 6 is non-time-critical, as the site does not pose immediate threat to public health, welfare, or the environment, and therefore, a planning period of more than six months is appropriate.

Additionally, the California Health and Safety Code (Ca-HSC) specifies the preparation of necessary documentation that depends upon the costs of the removal action. The selection of documentation is summarized in Table 1-1. The Ca-HSC requires development of a Remedial Action Plan (RAP) for removal actions that cost \$1 million or greater or a Removal Action Work Plan (RAW) for removal actions that cost less than \$1 million. Further, the Ca-HSC authorizes the Department of Toxic Substances Control (DTSC) to waive the RAP requirements, in favor of a RAW, for removal actions when an Imminent and/or Substantial Endangerment (I&SE) determination exists. DTSC also may waive the RAP requirements of Ca-HSC §25356.1(d)(1) – (6) if a RAP document that meets the requirements of Ca-HSC §25356.1(h)(3) is prepared. The removal action at IR Site 6 is expected to cost more than \$1 million, so the Navy will satisfy Ca-HSC provisions relating to a RAP. This EE/CA, together with the Action Memorandum (AM) to be prepared following this document, will satisfy the substantive requirements of a RAP.

This EE/CA provides information on the effectiveness, implementability, and cost of potential removal options. It also provides a rationale and basis for selecting a preferred removal action alternative, satisfies administrative requirements, and serves as the basis for a future CERCLA removal action. The DON is the lead agency for IR Site 6 and the removal action that will occur at IR Site 6. As the lead agency, the DON has final approval authority of the recommended alternative selected and overall public participation activities. The DON is working in cooperation with the California Environmental Protection Agency (Cal-EPA) DTSC; the Regional Water Quality Control Board (RWQCB), Colorado River Basin Region; and the public in the implementation of this removal action.

**Table 1-1. Selection of Decision Documents**

<b>Cost Of Action</b>	<b>Planning Period</b>	<b>Documents Needed<sup>(a)</sup></b>
(b)	Emergency <sup>(b)</sup>	AM
< \$1 Million	≤ 6 Months	AM/RAW
< \$1 Million	> 6 Months	AM/EE-CA/RAW
From \$1 to 2 Million	≤ 6 Months	AM/RAP <sup>(c)</sup>
From \$1 to 2 Million	> 6 Months	AM/EE-CA/RAP <sup>(c)</sup>
≥ \$2 Million	≤ 6 Months	AM/RAP
≥ \$2 Million	> 6 Months	AM/EE-CA/RAP

- (a) Ca-HSC §25356.1(h)(1) provides that a RAP is not required if an I&SE conditions exists, regardless of costs. In such a case a RAW would be required.
- (b) For Emergency Removals, regardless of costs of action, DON will prepare only an AM which will be finalized within 60 days of initiation of on-site removal activity.
- (c) For removal actions estimated to cost \$ 1 million dollars or more but less than \$ 2 million, the State may, pursuant to Ca-HSC §25356.1(h)(3), waive the RAP content requirements of Ca-HSC §25356.1(d).

This EE/CA is being issued in accordance with the MCAGCC Twentynine Palms Community Relations Plan (January 10, 1994) and administrative records to facilitate public involvement in the decision making process. The public is encouraged to review and comment on the proposed removal activities described in this EE/CA. To gain a more thorough understanding of the activities associated with this removal action, the public is encouraged to review the administrative record for this activity by contacting:

Leon Bowling  
Natural Resources/Environmental Affairs Directorate  
Building 1415, MCAGCC, Box 788110  
Twentynine Palms, California 92278-8110  
(760) 830-7695, extension 250

## Section 2.0: SITE CHARACTERIZATION

This section summarizes available data on the physical, demographic, and other characteristics of IR Site 6 and the surrounding area. These data include soil sample analytical results and a human health risk assessment conducted as part of the Removal Site Evaluation (RSE). The primary source of information contained in this section is the RSE Report (Battelle, 2001).

### 2.1 Site Description and Background

The following is a description of the area of interest, the site history, the current status and conditions, the geology, and the climate that are present at MCAGCC IR Site 6. The MCAGCC also is commonly referred to as the “Base” in this report.

**2.1.1 Site Location.** MCAGCC is an active military installation located in south-central San Bernardino County, California (Figure 2-1). The Base covers approximately 935 square miles of remote desert and is used primarily for live-fire training exercises. The Mainside area is located in the southern section of the Base, approximately 5 miles north of the city of Twentynine Palms, California. The Mainside area contains the majority of the infrastructure of the Base and is approximately 3,500 acres in area (Figure 2-2). IR Site 6 is located in the southeastern part of the Mainside area in the Marine Palms housing area of the Base (Figure 2-2).

**2.1.2 Type of Facility and Operational Status.** The Army began using the Base, then called Camp Condor, in 1941 to train glider crews and by 1943 the area was used extensively for fighter pilot training. The Navy also used the Base for bombing and gunnery ranges until the end of World War II. At the end of World War II, Camp Condor became inactive until the Marine Corps reactivated the facility in 1952. The current Base was established in 1952 to provide the Marine Corps with a training facility that would allow them to perform live-fire of newer, larger weaponry than could be used at existing bases such as Camp Pendleton. Since 1952, the Base has been occupied by the Marine Corps. The Marine Corps presently uses the facility to perform Combined Arms Exercises (CAX), in which maneuvers are carried out under realistic, live-fire conditions.

In c. 1942, the Army constructed a wastewater treatment facility to support its glider field operations. The facility consisted of an Imhoff tank, two sludge drying beds, and four percolation ponds. Domestic sewage was dried in the sludge drying beds, each of which covered approximately 1,500 ft<sup>2</sup>. The wastewater was allowed to evaporate or percolate into the ground through the percolation ponds, which covered approximately 20 acres. The wastewater treatment facility was removed in 1953 and a portion of the Marine Palms housing area was constructed on the site. The location of the ponds in relation to the buildings in the Marine Palms housing area are shown in Figure 2-3. Currently, the site consists of residential buildings, landscaped yards, playgrounds, roadways, and paved parking areas. The area currently is scheduled for demolition and construction of new housing. Portions of Marine Palms have already been demolished in preparation for construction of new housing units.

**2.1.3 Structures and Topography.** The Mainside area at MCAGCC Twentynine Palms is located on the eastern edge of the Morongo Basin. This large tectonic basin is located within the southeast portion of the Mojave Desert Geomorphic Province. The extent of the basin is defined by the San Bernardino Mountains to the southwest, the Little San Bernardino Mountains and Joshua Tree National Park to the southeast, the Bullion Mountains to the northeast, and remote portions of the Mojave Desert to the northwest. The basin is generally defined by moderately rolling desert topography and is characterized by a series of northwest-trending normal and strike-slip faults. The blocks between the faults form individual groundwater subbasins that are partially connected hydraulically across low-permeability

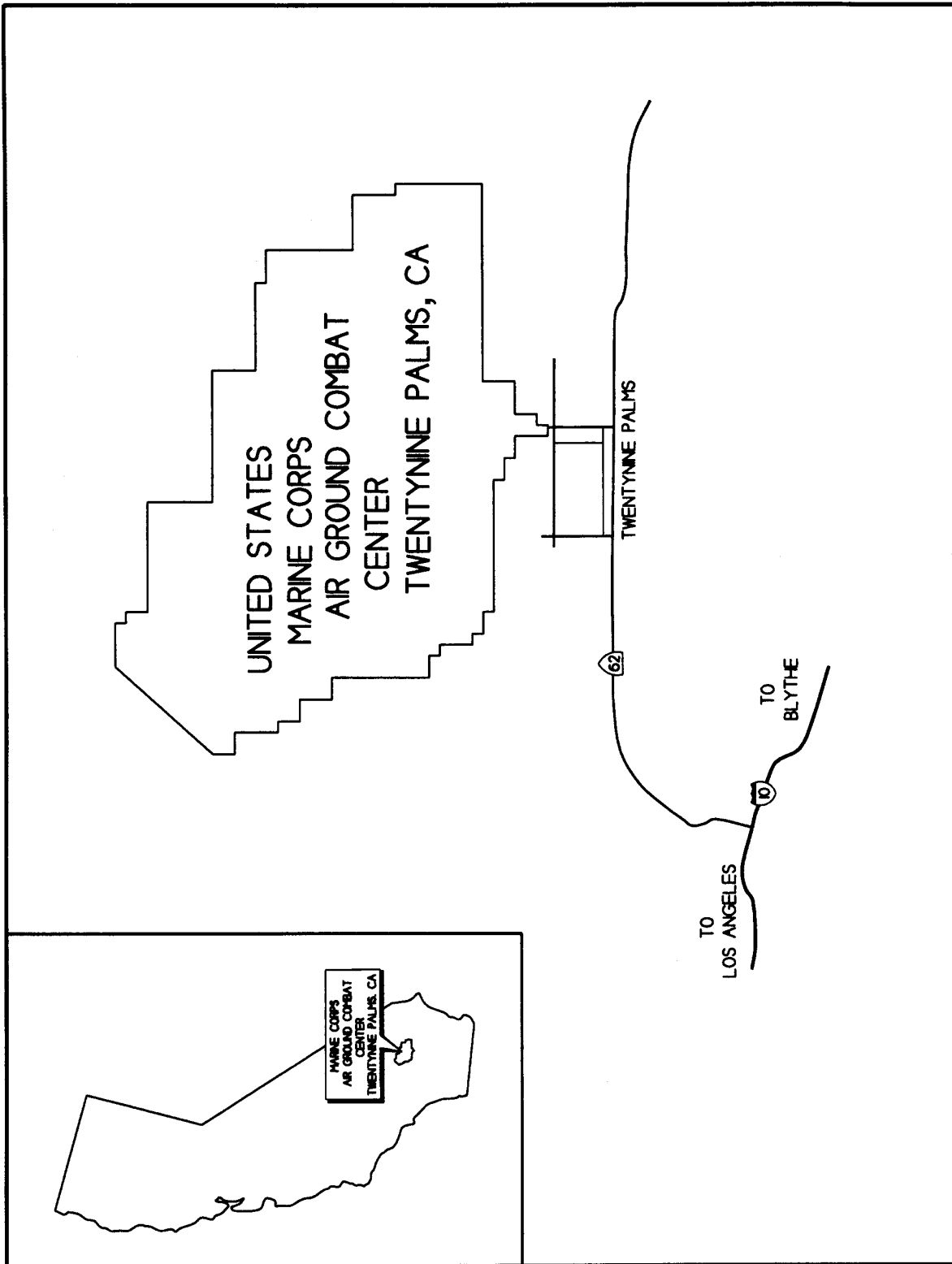


Figure 2-1. Location of Marine Corps Air Ground Combat Center

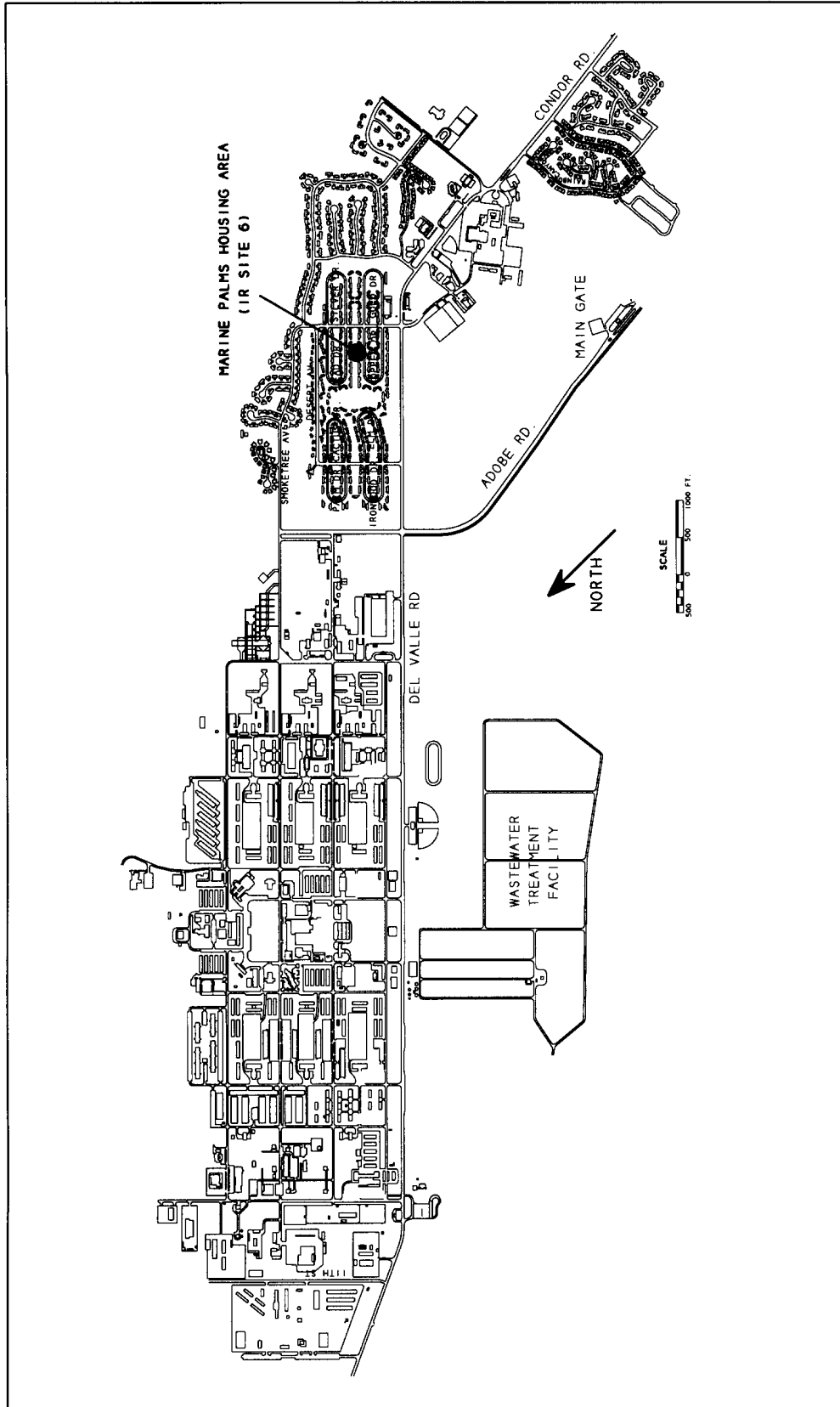
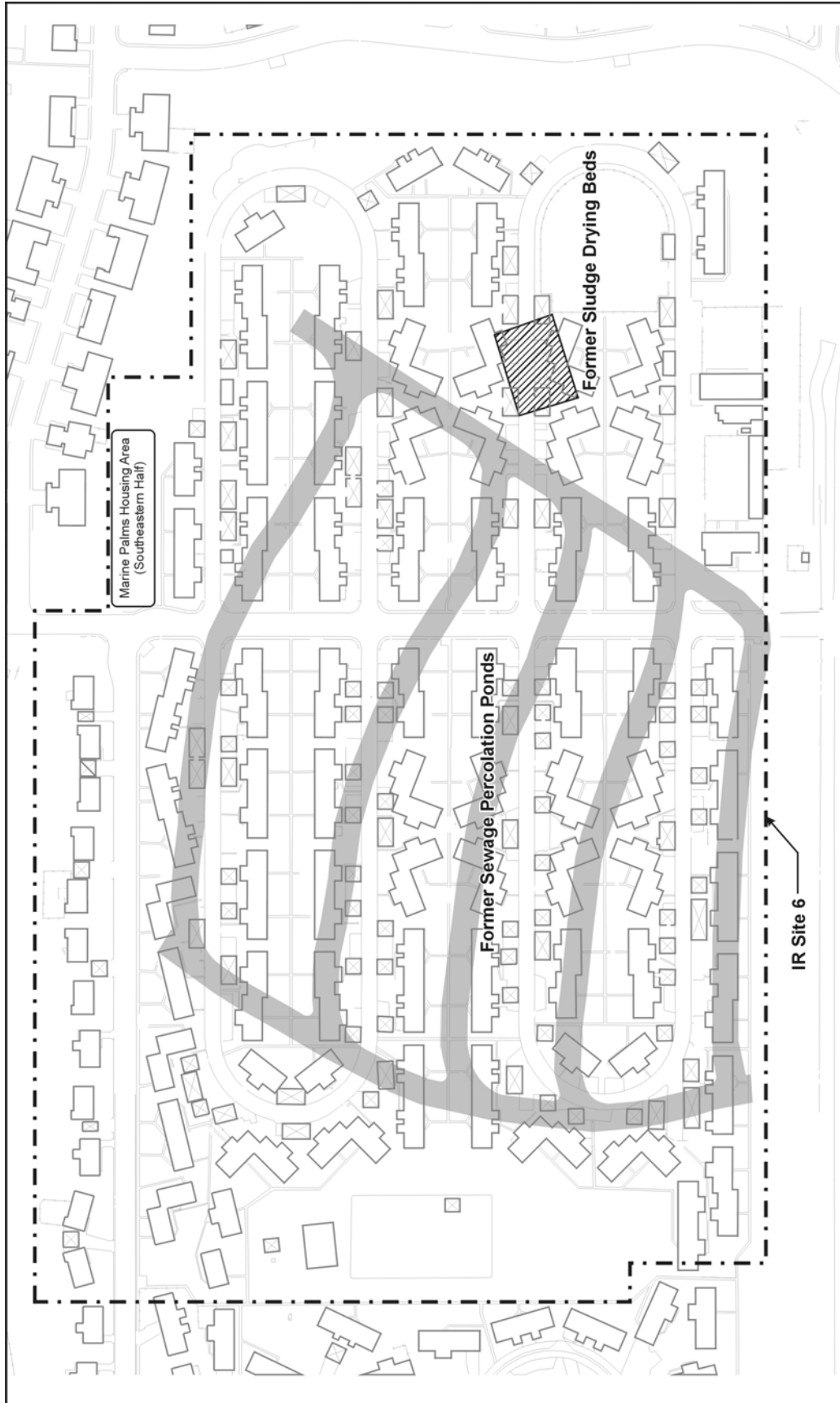


Figure 2-2. Location of MCAGCC IR Site 6



**Figure 2-3. Location of Former Percolation Ponds and Former Sludge Drying Beds at IR Site 6**

materials adjacent to the fault zones. These northwest-trending geologic features are subregional in extent, and the West Bullion Mountain fault defines the eastern limit of the regional (i.e., Morongo) groundwater basin.

Groundwater levels generally decrease from southwest to northeast across the Morongo Basin in a series of steps that correspond to the location of these faults.

MCAGCC Mainside installation is bounded by two major faults. The Mesquite Lake fault is located approximately 1,000 ft to the southwest of the facility, and the West Bullion Mountain fault is located along the northeastern edge of the area (Figure 2-4). Groundwater levels in this area are lower than levels in the other subbasins to the southwest.

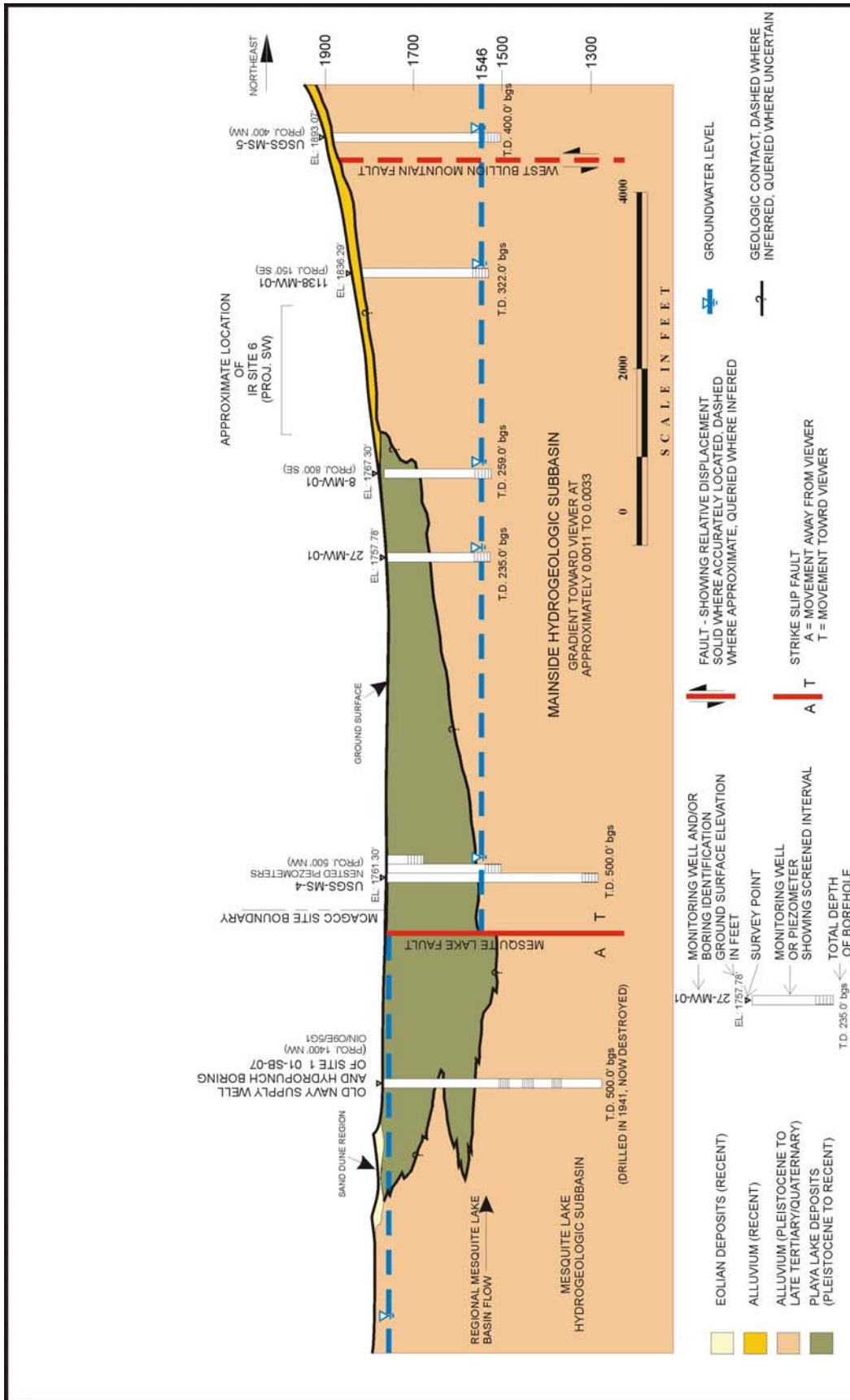
The topography of MCAGCC Mainside area is characterized by two different land types. The developed part of the Mainside Facility, including IR Site 6, is mainly situated on the gentle slope of a southwest-trending alluvial fan. This fan extends from the Bullion Mountains to the northeast to the edge of Mesquite Lake to the southwest. The topography has been only slightly modified by cutting the upper portion of the slope and filling the lower portion adjacent to the dry lake. Mesquite Lake is a flat-lying dry lake that is located adjacent to the Mesquite Lake fault and occupies the southwestern edge of the facility. This area is largely unused, except for several large, earthen-bermed sewage evaporation ponds located approximately 1 mile northwest of IR Site 6.

**2.1.4 Geology/Soil Information.** The Morongo Basin is characterized by unconsolidated deposits of eolian sand, alluvial sands and gravels, and lacustrine silts, clays, and evaporates in playa lakes. The near-surface deposits are underlain by older alluvial sand deposits with minor gravel layering. Bedrock in the basin near MCAGCC is 1,000 to 3,000 ft below ground surface (bgs) and is composed of crystalline igneous and metamorphic rocks. Detailed analyses of the geology and hydrology of the region are presented in Londquist and Martin (1989).

IR Site 6 is located on Cajon soils (Jacobs Engineering Group, Inc. [JEG], 1995) derived from alluvial fan materials and are mainly composed of a light brownish-gray fine sand. These soils are well drained and have moderate to high permeability. The Cajon soils are located in a zone corresponding to the occurrence of the alluvial fan and lie between the adjacent lacustrine soils of the playa lake (i.e., Mesquite Lake) and the outcropping quartz monzonite bedrock of the Bullion Mountains. The Bullion Mountains are the parent material of the alluvial fan/Cajon soils.

Environmental investigations in the Mainside area have encountered fine to medium alluvial fan deposits with sand and some angular cobbles and gravel fragments. Occasional thin gravel lenses or clayey silt and sand lenses also have been encountered during environmental drilling operations. These alluvial deposits interfinger with lacustrine clays that are the predominant lithology near the bottom, or downslope area, of the Mainside area of the Base.

The primary water table beneath the Mainside area, referred to as the Mainside subbasin, generally occurs between 1,546 and 1,547.5 ft above mean sea level (amsl) (land surface elevation in the Mainside area ranges from approximately 1,760 to 1,875 ft amsl). Water levels in this aquifer decrease very slightly from the northwest to the southeast. The gradient of this water table is less than 0.5 ft/mile. Water-level data from the area indicate that the water levels in the Mainside subbasin remain stable throughout the year. Perched groundwater (i.e., groundwater that occurs above the primary aquifer) occurs locally throughout the Mainside subbasin.





Perched groundwater along the southwest boundary of Marine Palms is intercepted by subsurface drains and discharged through sumps to the surface stormwater drainage channel adjacent to Del Valle Road. This water is diverted into a nearby surface water impoundment.

**2.1.5 Surrounding Land Use and Populations.** The Mainside area has been developed for multiple uses including housing, recreation, offices, support, medical, training, storage, and maintenance (Figure 2-5). The immediate areas surrounding IR Site 6 are dedicated to residential housing or support facilities for the housing area (recreation, fast food, commissary, schools, etc.) (Figure 2-6).

The Mainside area of the Base is located approximately 5 miles north of the city of Twentynine Palms, CA, and is separated from the developed area of the nearby community by approximately 2 miles of sparsely populated desert. There are no domestic or industrial uses of groundwater in the vicinity of IR Site 6.

The military population of the Base was 7,561 in 1997 and is expected to increase to 9,394 by 2002 (SWDIV, 2001). In 1990 the U.S. Census reported that the total population of the Base was 8,413. The 2000 U.S. Census reported the population of the City of Twentynine Palms to be 14,764. The population statistics for the IR Site 6 are presented in Table 2-1.

**2.1.6 Sensitive Ecosystems.** IR Site 6 consists of land developed for residential housing. Surrounding areas include residential and developed land used for various Base activities as shown in Figures 2-5 and 2-6. Developed areas include roads, buildings, and other areas where the land has been altered to such a state that natural vegetation is not likely to reestablish. Vegetation at the site is primarily ornamental, typical of residential areas. Small portions of native vegetation communities occur in the north of IR Site 6, consisting of stabilized and partially stabilized sand fields (SWDIV, 2001).

Because the site is located within a residential housing area for the Base, the wildlife receptors at the site are limited. Wildlife species likely to occur at IR Site 6 are those associated with developed areas and include round-tailed ground squirrel (*Spermophilus tereticaudus*), common raven (*Corvus corax*), mourning dove (*Zenaida macroura*), common grackle (*Quiscalus quiscula*), northern mockingbird (*Mimus polyglottos*), and house finch (*Carpodacus mexicanus*) (SWDIV, 2001). These species are expected to occur commonly throughout the Mainside area.

There are no sensitive species known to occur at IR Site 6; however, several sensitive species are found elsewhere at MCAGCC (see Table 2-2). One federally- and state-listed threatened species, the desert tortoise (*Gopherus agassizi*), is known to occur in the Bullion Mountains northeast of IR Site 6 but is not expected to occur at or near the site due to the absence of habitat. Four plant species of regional special concern were identified; foxtail cactus (*Coryphantha alversonii*), Utah vine milkweed (*Cyanan-chum utahense*), white-margined beardtongue (*Penstemon albomarginatus*), and jackass-clover (*Wisli-zenia refracta* ssp. *refracta*); however, these plants would not occur at the site due to lack of suitable habitat.

Across Del Valle Road to the west of IR Site 6, stormwater retention ponds have been implemented as part of the Best Management Practices (BMP) for the control of industrial stormwater under the Clean Water Act. These ponds and surrounding area have been developed by the Base as a Wildlife Viewing Area (see Figure 2-6). In this area, unlined ponds receive stormwater runoff from various areas of the Base, including IR Site 6, and also receive discharge from sumps installed to collect groundwater pumped from the perched aquifer at IR Site 6 for the purpose of foundation stabilization. Currently, the retention ponds have standing water year-round and thus attract wildlife (migratory birds, waterfowl, bats, coyotes, reptiles, rodents, etc.). Small fish are known to exist in the ponds. The area has been landscaped

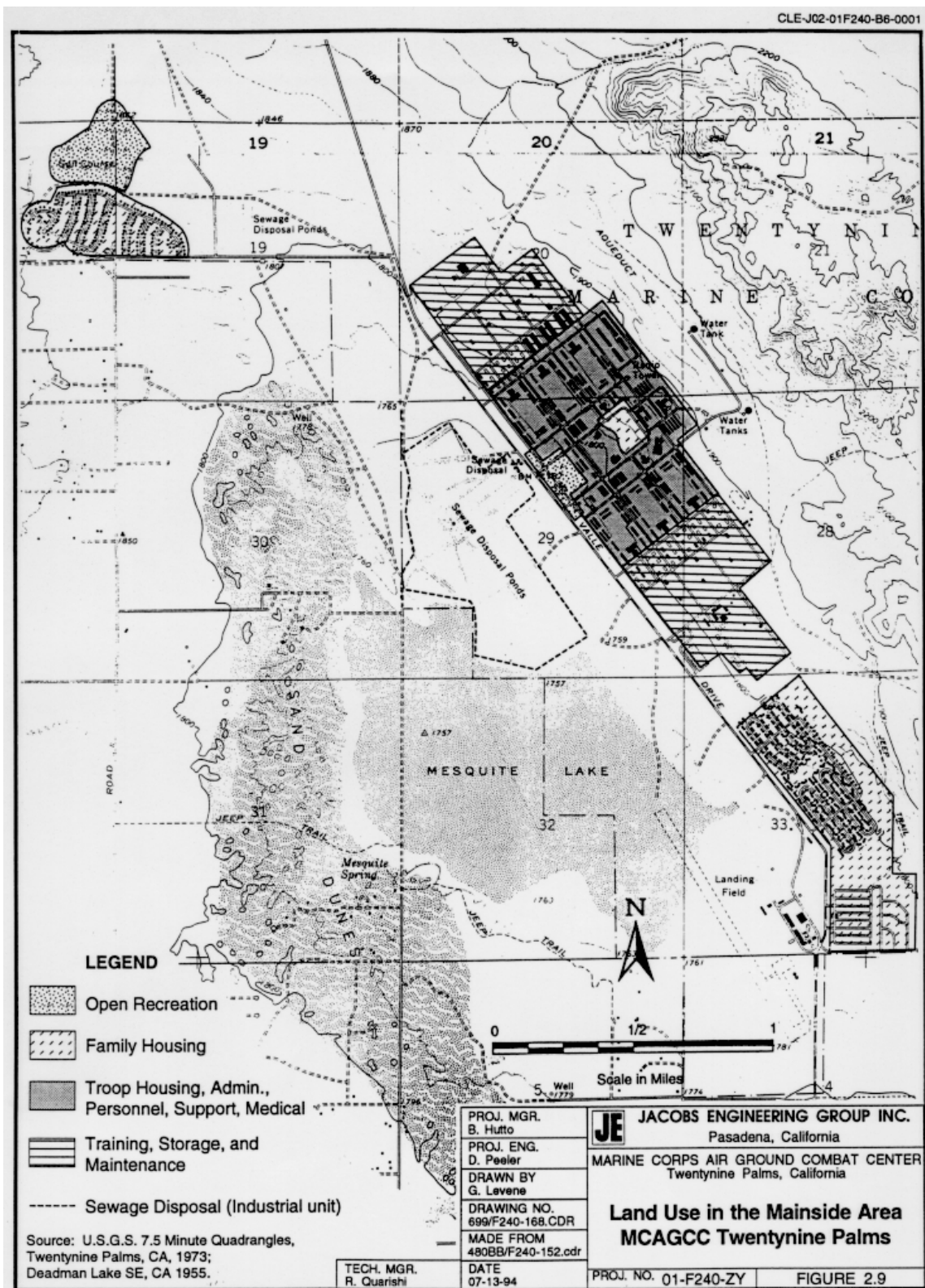


Figure 2-5. Land Use in the Mainside Area





**Table 2-1. Population Statistics for IR Site 6**

Item	Number
Number of existing buildings	156
Number of residential units	371
Number of demolished buildings	26
Number of demolished residential units	96
Number of current residents	598
Number of new (planned) buildings	89
Number of new (planned) residences	353

**Table 2-2. Sensitive Species Potentially Occurring at MCAGCC**

Common Name/Scientific Name	Status <sup>(a)</sup> (Fed/State/CNPS)	Habitat
<b>Plants</b>		
Foxtail cactus/ <i>Coryphantha alversonii</i> (= <i>Escobaria vivipara</i> var. <i>alversoni</i> )	None/None/4	Mojavean desert scrub
Jackass-clover/ <i>Wislizenia refracta</i> ssp. <i>refracta</i>	None/None/2	Mojavean desert scrub, desert dunes
Utah vine milkweed/ <i>Cyananchum utahense</i>	None/None/4	Mojavean desert scrub
White-margined beardtongue/ <i>Penstemon albomarginatus</i>	None/None/1B	Mojavean desert scrub, desert dunes
<b>Reptiles</b>		
Desert tortoise/ <i>Gopherus agassizi</i>	T/T/NA	Mojavean desert scrub, desert wash, Joshua tree habitats

(a) 1B = California Native Plant Society (CNPS) designation for those species that are rare, threatened, or endangered in California and elsewhere; 2 = CNPS designation for species that are rare and endangered in California, and common elsewhere; 4 = CNPS designation for species of limited distribution and their vulnerability or susceptibility to threat is low; NA = not applicable; T = threatened.

Sources: Skinner and Pavlick, 1994; SWDIV, 1998; CDFG, 2001; CNPS, 2001.

with drought-tolerant indigenous plants including mesquite, desert willow, palo verde, saltbush, and other native species.

**2.1.7 Meteorology.** The Morongo Basin area of the Mojave Desert is classified as having an arid, upland desert climate. The summer months are characterized by high temperatures, low humidity, and clear, sunny days. The average annual temperature is 67°F. Temperatures frequently exceed 100°F, and occasionally reach 120°F in the summer, and drop to as low as 15°F in winter months. Average annual precipitation is about 4 inches, most of it a result of thunderstorms from July to January. Some freezing rain and snow does occur during the winter at higher elevations. The relative humidity averages 29% and ranges from 2% in the summer to 60% in the winter. The prevailing wind is from the northwest, west, and southwest. The average wind velocities vary from 3 to 12 miles per hour, and can gust to more than 50 miles per hour.

## **2.2 History of Previous Removal Actions, Investigations, and Activities**

The history of previous removal actions, investigations, and any other environmental activities (i.e., monitoring) is summarized in this section. To date, several investigations have occurred at IR Site 6; however, there have been no removal actions or other environmental activities at the site. Table 2-3 lists these investigations. A synopsis of each of the investigations is presented in this subsection. Additional details of the investigations are presented in Section 3 of the RSE Report (Battelle, 2001).

**Table 2-3. Previous Environmental Investigations**

<b>Date</b>	<b>Investigation</b>	<b>Report/Activity</b>
1985	Brown and Caldwell	Initial Assessment Study
1993-1996	Jacobs Engineering Group	Site Inspection Report
1995	CDM Federal	Groundwater Monitoring
1997	Environmental Chemical Corp.	Draft EE/CA
1997	Environmental Chemical Corp.	Soil Sampling Work Plan and Draft Report
1999	Battelle	Groundwater Monitoring
2000	Battelle	Soil Sampling
2001	Battelle	Removal Site Evaluation

**2.2.1 Brown and Caldwell, 1985.** An Initial Assessment Study by Brown and Caldwell was performed in 1985 (Brown and Caldwell, 1985). No environmental samples were collected for this study. Their recommendation was: “Based on typical concentrations of heavy metals in city sludges, this site poses no potential threat to human health or to the environment. Therefore, no further action is recommended.”

**2.2.2 Jacobs Engineering Group Inc., 1996.** JEG produced a Site Inspection (SI) report that was based on fieldwork performed during 1993 (JEG, 1996). The soils below the former percolation ponds showed detectable levels of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, and polychlorinated biphenyls (PCBs). The pesticide dieldrin was the only compound found above the U.S. EPA Region 9 Preliminary Remediation Goal (PRG) (U.S. EPA, 2001).

A screening-level risk assessment was performed by JEG for the soil contamination detected at IR Site 6 (JEG, 1996). The risk assessment indicated that the soil in the former percolation ponds poses a residential incremental lifetime cancer risk greater than one in one million, and that the cancer risk associated with soils in the former sludge beds is less than one in one million. The principal risk drivers for the former ponds were determined to be arsenic, Aroclor-1254, and beryllium. The noncancer risk hazard quotient for both the sludge beds and the percolation ponds was calculated to be greater than 1.0 due to the presence of several metals in the soil. The ecological risk assessment determined that no complete exposure pathways exist for the soil at the site.

The JEG SI report recommended further action/further investigation of soil at the site based on comments from the RWQCB. One issue raised by both the RWQCB and the DTSC (JEG, 1996, Appendix J) was that the percolation pond area did not have enough sample coverage to adequately characterize the impact to soil. The agencies indicated that each percolation pond should have a minimum of four soil samples to provide minimum coverage for the area used for waste evaporation/percolation. Based on these comments, additional soil sampling was proposed. Additional groundwater sampling was not recommended.

**2.2.3 CDM Federal Programs Corporation, 1995.** Groundwater monitoring was performed in January 1995 by CDM Federal Programs Corporation (CDM, 1995). They reported that no organic or inorganic constituents were detected above the practical quantitation limits (PQLs).

**2.2.4 Environmental Chemical Corporation, 1997a.** Environmental Chemical Corporation (ECC) in conjunction with Harding Lawson Associates produced a Draft EE/CA for IR Site 6 in January 1997 (ECC, 1997a) based on data presented by JEG in their SI Report and the associated risk assessment for the site (i.e., no new data were collected). The EE/CA evaluated existing data for the site and proposed three alternatives for a removal action. The alternatives included isolation/containment, excavation

and disposal, and no action. The recommended alternative was no action. The report cited disruption of the housing area and a layer of clean fill that was added during construction of the houses as primary reasons for recommending the no action alternative.

**2.2.5 Environmental Chemical Corporation, 1997b.** ECC prepared a work plan and performed soil sampling in 1997 for PCBs and heavy metals at IR Site 6 under the direction of the Army Corps of Engineers (ECC, 1997b). The results of this investigation were not finalized or released. This report was terminated in the draft stage.

**2.2.6 Battelle, 1999.** Groundwater samples were collected in July 1999 from monitoring wells (6-MW-03, 6-MW-04, and 6-MW-05). The samples were analyzed for total petroleum hydrocarbons (TPH) purgeable, TPH extractable, VOCs, and Title 22 metals (Battelle, 1999). Toluene was detected in well 6-MW-05 (0.64 µg/L) and was the only organic compound detected. The metals arsenic (0.22 mg/L), chromium (0.039 mg/L), molybdenum (0.12 mg/L), vanadium (0.66 mg/L), and zinc (0.1 mg/L) were present in the groundwater. Upon review of these data, the regulatory agencies requested additional sampling for PCBs and speciation of the chromium into trivalent (Cr [III]) and hexavalent (Cr [VI]) forms.

**2.2.7 Battelle, 2000.** In December 1999, Battelle collected 18 soil samples from five locations at the site (Battelle, 2000a). The purpose for collecting these samples was to address concerns that MCAGCC had concerning ECC's analytical program and to address the comments and concerns by the DTSC regarding JEG's 1996 SI report. The samples were analyzed for PCBs and California Title 22 (CAM 17) metals in a California Department of Health Services (DHS)-approved laboratory. The results indicated that Aroclor-1254 and arsenic exceeded their respective U.S. EPA Region 9 PRGs. Although arsenic was detected above its residential PRG of 0.38 mg/kg in three samples at concentrations of 1.0, 0.7, and 0.6 mg/kg, these concentrations were below the MCAGCC 99th percentile background value for arsenic for the Mainside area (8.24 mg/kg). This background value likely reflects the high, naturally occurring concentrations of several heavy metals in the local and regional soils. The report recommended further evaluation of the PCBs in the soils at the site.

**2.2.8 Battelle, 2001.** The purpose of this investigation was to collect additional soil and groundwater data for IR Site 6 and to develop an RSE Report based on these new data and data previously collected at the site. The purpose of the RSE was to provide information to support whether a removal action of environmental media from IR Site 6 is necessary for the protection of human health and the environment and to determine if this site is suitable for continued use as a military housing area. This information include details regarding historical uses and practices that occurred at and around IR Site 6, analytical data that characterize current conditions of environmental media at the site, and a risk assessment that calculated risks for intended future receptors and exposure pathways. In addition, concentrations of constituents of potential concern (COPCs) in environmental media were compared with applicable or relevant and appropriate requirement (ARARs) to evaluate the risk posed by the site. Conclusions and recommendations regarding the need for removal actions and suitability of IR Site 6 for military housing based on an ARARs and a risk-based evaluation were provided. Based on the low potential for exposure to humans and the environment, groundwater response actions were not recommended. For soil contamination, it was recommended that chemicals in soil be addressed based on the results of the risk assessment and comparison to ARARs.

## **2.3 Source, Nature, and Extent of Contamination**

The history of the site, including prior use, is well known for IR Site 6 and the Marine Palms housing area. Knowledge of the nature and distribution and prior usage of the constituents detected in soil at IR Site 6 can be used to make some inferences about the source and extent of the contamination.

PCBs and TPH are widely and randomly spread across the entire site. The most likely source for both of these compounds is waste oil used for dust control. Surface application of waste oil was commonly done in the past to suppress windblown dust. Prior to the late 1970s, PCB-laden transformer oil could have been mixed with the waste oil prior to spreading. It is important to note that only one PCB mixture, Aroclor 1254, is present at the site. The distribution and concentration of Aroclor 1254 detected at IR Site 6 is shown in Figure 2-7. This may be due to a limited time frame when dust suppressant was applied. The wastewater evaporation ponds were constructed in 1942 and abandoned in 1945. The Marine Palms housing area was constructed following destruction of the ponds in 1953 when the Base was reactivated by the Marine Corps. The application of dust suppressant likely only occurred during the construction of the housing, prior to seeding of the lawns for grass. Furthermore, there appears to be no correlation of the occurrence of the Aroclor 1254 and the TPH with the footprint of the former evaporation ponds, suggesting that a source other than the ponds is responsible for these compounds. The much higher occurrence of the PCBs and the TPH in the surface samples also suggests a surficial release scenario.

The infrequent occurrence of low concentration of other organic compounds in the soil at IR Site 6 is likely due to point sources that have occurred over the history of the site. Trichlorofluoromethane (Freon<sup>®</sup> 11) is an exception, and is suspected of being present in used refrigeration oil, which could have been mixed with the waste oil used for dust suppression.

Two pesticides, dieldrin and chlordane, were detected sporadically at concentrations that exceeded risk-based screening levels identified in the RSE Report (Battelle, 2001), including three near-surface soil locations (6-C0-S, 6-H7-S, and 6-H4-S) and one 3-ft-bgs location (6-H4-3). Only one of the three near-surface samples (6-C0-S) was not co-located with an elevated PCB concentration. The presence of these pesticides is most likely the result of previously accepted and approved product use as an insecticide (e.g., for treating termites). These pesticides adhere tightly to soil and biodegrade very slowly in the environment. The extent and concentrations of dieldrin and chlordane detected at IR Site 6 are shown in Figures 2-8 and 2-9, respectively.

Several metals were detected in soil at IR Site 6. Metals are natural elements derived from native geologic materials; therefore, the presence of metals in soil does not indicate that these constituents have been released to the environment as a result of human activities. To distinguish natural versus anthropogenic levels of metals, measured concentrations of metals at IR Site 6 were compared to the background concentration range for each metal for MCAGCC soils. Also, statistical tests recommended in the DTSC's guidance document *Selecting Inorganic Constituents as Chemicals of Potential Concern at Risk Assessments at Hazardous Waste Sites and Permitted Facilities* (DTSC, 1997) were performed to help identify metals that are COPCs in soil at IR Site 6. Other guidance consulted for this purpose included the Navy's background document entitled, *Guidance for Environmental Background Analysis Volume I: Soils* (Battelle et. al., 2002). Of the 17 metals detected in soil at IR Site 6, seven (beryllium, cadmium, lead, mercury, nickel, selenium, and thallium) were identified as COPCs and included in the risk assessment for the site.

Shallow perched groundwater that underlies at IR Site 6 has not been impacted by organic contamination, as demonstrated by analyses of groundwater samples that were collected in February 2001 and analyzed for an extensive suite of organic compounds including PCBs, organochlorine pesticides, VOCs, SVOCs, and TPH. Groundwater samples also were analyzed for Title 22 (CAM 17) metals, and Cr (III)/(VI). Four inorganic constituents were detected in groundwater in the February 2001 samples, including arsenic, chromium, molybdenum, and vanadium. The concentrations of the constituents that were detected in February 2001 are consistent with concentrations measured in a previous basewide sampling event conducted in July 1999. Molybdenum and chromium concentrations detected at IR Site 6 are generally consistent with levels elsewhere in the Mainside area.

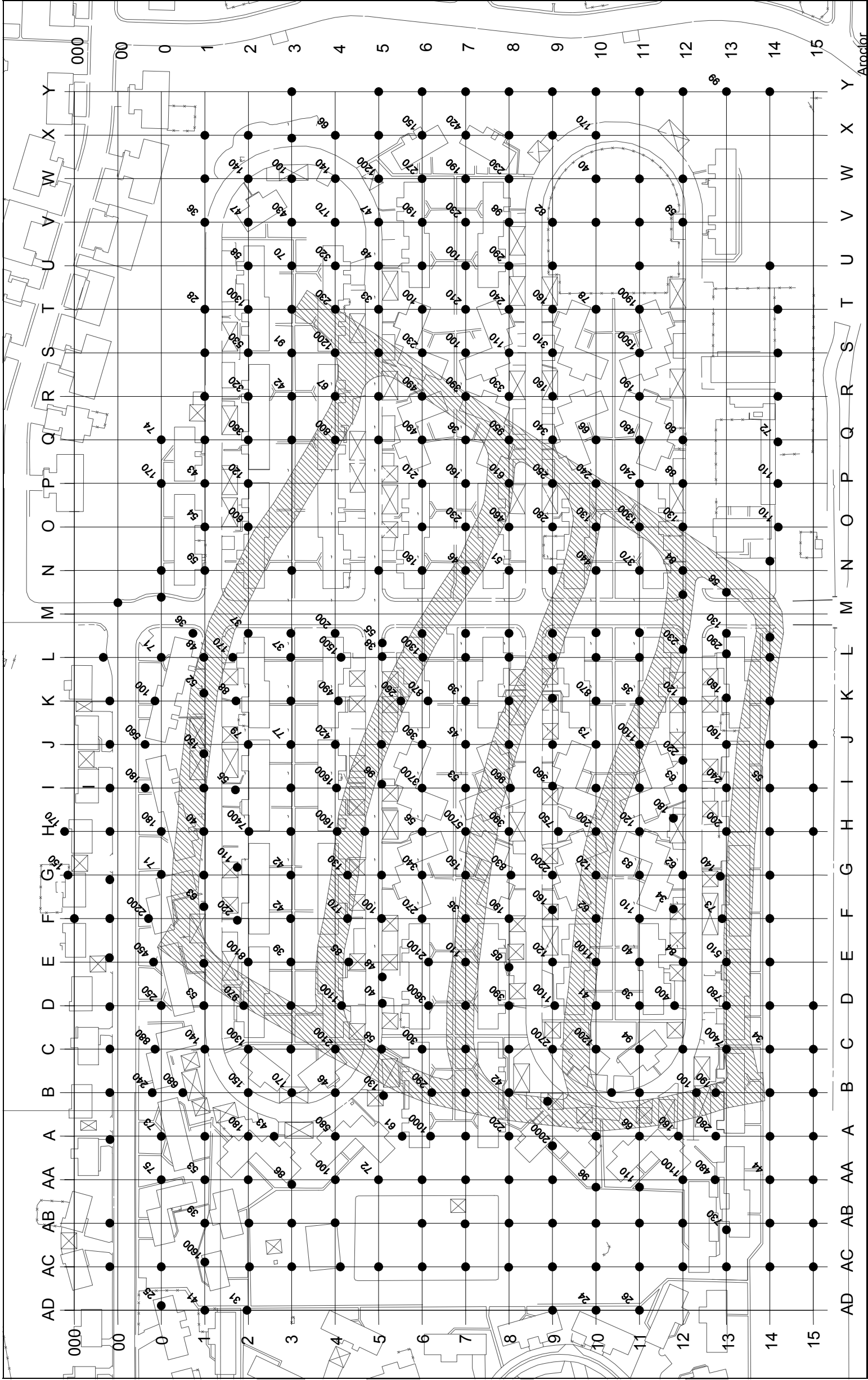
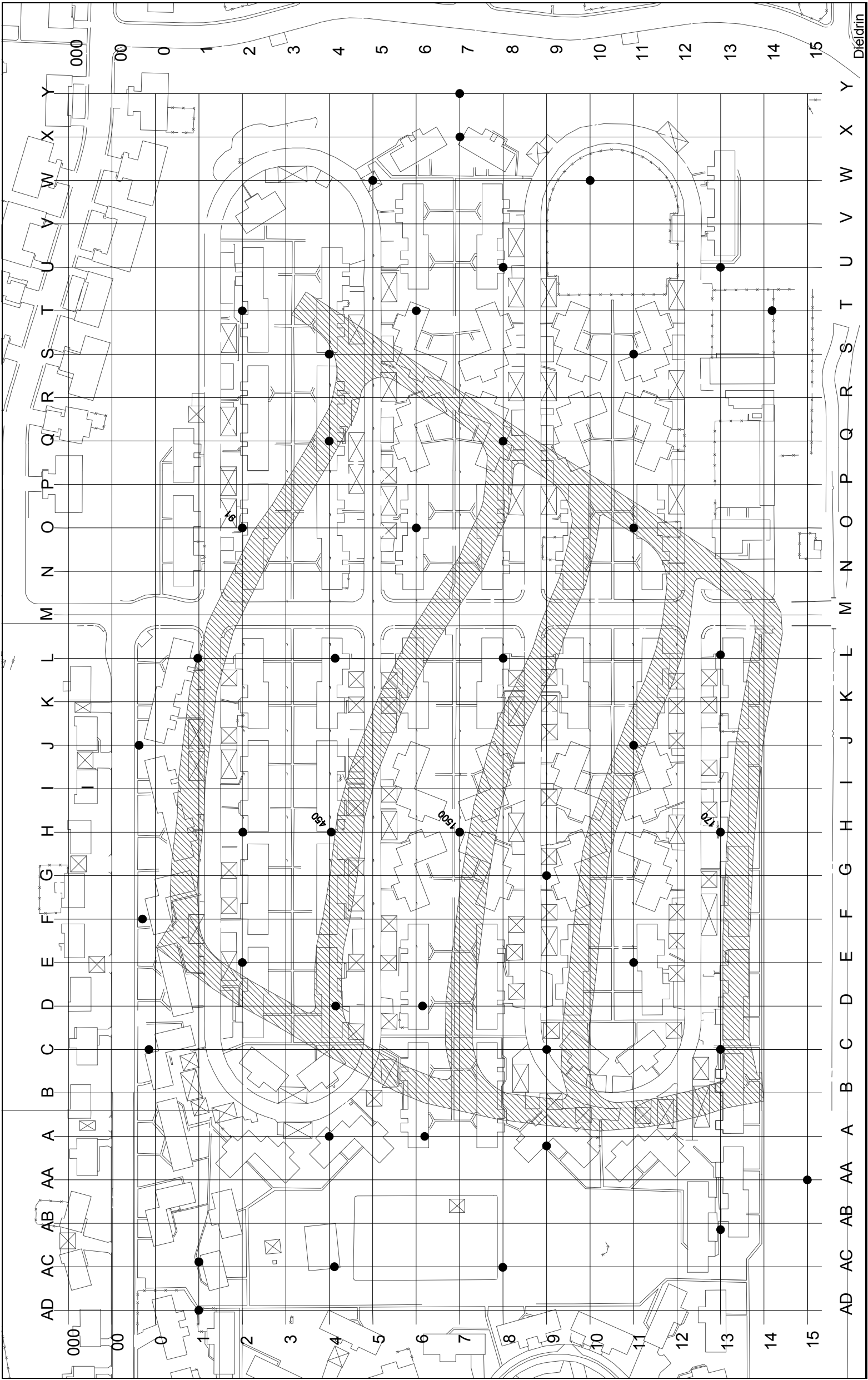


Figure 2-7. Extent and Concentration of Aroclor 1254 Detected at IR Site 6





● Sample Location (Results in µg/kg, no data indicate result <MRL)

Figure 2-8. Extent and Concentration of Dieldrin Detected at IR Site 6

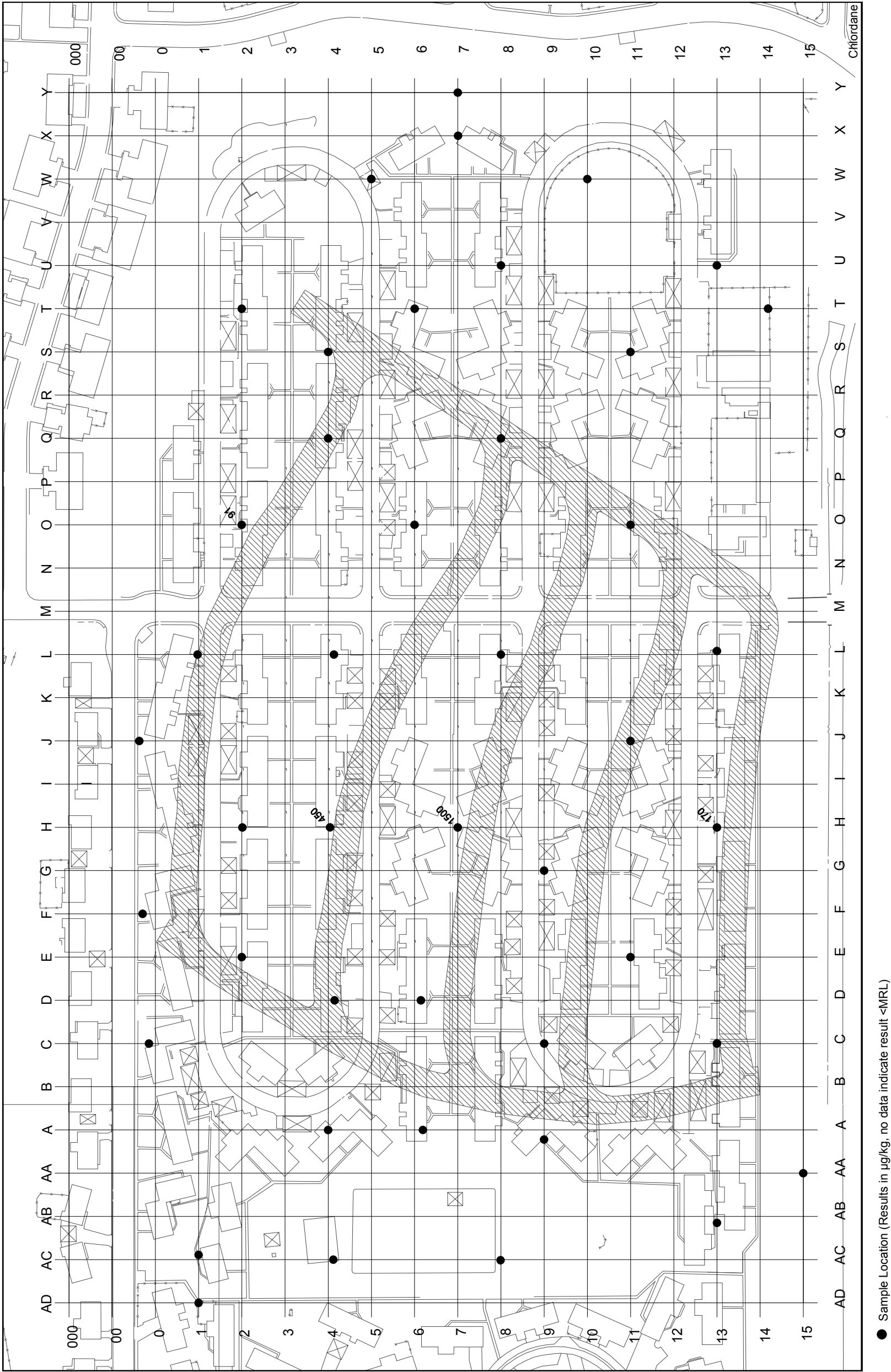


Figure 2-9. Extent and Concentration of Chlordane Detected at IR Site 6

The levels of arsenic and vanadium detected in the shallow perched groundwater beneath IR Site 6 are among the highest concentrations detected in groundwater in the Mainside area but are similar to levels found in shallow perched groundwater elsewhere at the Base. These levels are also similar to levels found in groundwater throughout the Mojave Desert (U.S. Geological Survey, 2002). These metals are thought to be derived from desert salts that accumulated in surface soil and subsequently leached to the groundwater as a result of lawn irrigation in the housing area, and from metal-containing clay lenses within the alluvial fan and lacustrine playa deposits underlying the site. Salts that accumulated via evaporation in the nearby playa (e.g., Mesquite Lake) would have provided another source of salts that could be dispersed via wind and deposited on the surrounding landscape. Thus the metals detected in shallow perched groundwater at IR Site 6 are likely the result of natural processes and there is no indication that they are the result of a spill or other type of anthropogenic release.

## **2.4 Analytical Data**

Analytical data were obtained from samples collected during field events performed by Battelle in July/August 2000 and February 2001. The RSE Report (Battelle, 2001) describes the results of soil and groundwater analyses for PCBs, pesticides, VOCs, SVOCs, TPH, and metals (including Cr [III]/[VI]) collected during these events. Due to the known presence of PCBs at the site, the sample collection was driven by a plan to delineate the occurrence of PCBs across the site, whereas pesticides, VOCs, SVOCs, TPH, and metals were investigated in an exploratory mode at approximately 5 to 10% of the PCB sample locations. The sampling and analysis was performed in accordance with the approved work plans for the activities at the site (Battelle, 2000b).

**2.4.1 Presentation of Analytical Data.** The soil and groundwater analytical data obtained from the July/August 2000 and February 2001 field events are summarized in Section 4.0 of this report and provided in Appendix B of the RSE (Battelle, 2001).

**2.4.2 Data Quality.** The quality of the analytical data was examined for its overall adherence to the Quality Assurance/Quality Control (QA/QC) program outlined in the project work plan (Battelle, 2000b). A three-fold examination was performed to ensure that (1) the data was correctly analyzed, (2) the results were correctly reported, and (3) data outside the stated QA/QC limits were properly flagged.

The data were checked and flagged by the respective laboratories for adherence to laboratory quality control (QC) procedures. Following the examination by the laboratory, all of the samples were subjected to a Contract Laboratory Program (CLP) Level 3 data validation and 10% of the results were forwarded, along with the associated laboratory QC information, to an independent data validation service for CLP Level 4 validation (U.S. EPA, 1994, 1999). The results of the data validation are discussed in detail in Appendix C of the RSE Report (Battelle, 2001). Each data point was evaluated, on a pass/fail basis, according to the requirements outlined in the project work plan (Battelle, 2000b). Data that did not meet the validation criteria were labeled as “rejected” and were not used in the risk assessment. Overall, every class of compound, including the PCBs, met the 90% completeness goal stated in the project work plan.

## **2.5 Summary of Human Health Risk Assessment**

A human health risk assessment was performed as part of the RSE Report (Battelle, 2001). The risk assessment determined potential cancer and noncancer risks to residential receptors who will occupy the site in the future and a site worker who assumed to be involved in site demolition and construction activities. For Superfund-type risk assessments, residential exposure scenarios typically are based on a 30-year exposure duration (6 years as a child and 24 years as an adult). However, the majority of Marine residents are not likely to live in the Base housing for more than 3 years, and the Navy believes

that 10 years is a good estimate of the absolute maximum residence duration for anyone living at the site. Therefore, residential risks were calculated for a 3-year exposure scenario and a 10-year exposure scenario.

A summary of the total cancer and noncancer risks for all receptors are provided in Tables 2-4 and 2-5, respectively. The total risk values shown on these tables represent the sum of risks from exposure to all soil COPCs and all exposure pathways evaluated in the risk assessment. Risks were calculated based on the 95th percentile concentration (i.e., 95% of concentration measurements are below the values used to compute risk) of each COPC. Aroclor 1254, is the primary contributor to total cancer and noncancer risk. Dieldrin, and chlordane have lower risk than Aroclor 1254 but like Aroclor 1254 each poses a cancer risk greater than  $1 \times 10^{-6}$ . The distribution of Aroclor 1254, dieldrin and chlordane in soil at IR Site 6 are shown in Figures 2-7, 2-8, and 2-9, respectively.

Total risk for the adult and child residential receptors range from  $1.7 \times 10^{-6}$  to  $6.8 \times 10^{-6}$ , depending on the exposure duration and source of toxicity data used to compute risk. For both the 3-year and the 10-year exposure scenarios, Aroclor 1254, dieldrin, and chlordane are the primary contributors to the total cancer risk. Aroclor 1254 is the only COPC that exhibits a risk above  $1 \times 10^{-6}$  for the 3-year scenario, whereas Aroclor 1254 and dieldrin exhibit a risk greater than  $1 \times 10^{-6}$  for the 10-year exposure scenario. Total noncancer risk estimates for the residential receptors range from less than 1.0 to slightly above 1.0. The noncancer risk for the adult in the 3-year exposure scenario is less than 1.0, but the child noncancer risk is 1.4. Ingestion of Aroclor 1254 is the primary contributor to the noncarcinogenic risk. The noncancer risks calculated for the adult and child in the 10-year exposure scenario are less than 1.0.

Total cancer risk for the construction/excavation worker is less than  $1.0 \times 10^{-6}$  and noncancer risk for this receptor is less than 1.0.

Total cancer risk for the full-time occupational worker is  $1.8 \times 10^{-6}$ . Ingestion of and dermal contact with Aroclor 1254 primarily contributed to the risk. Total noncancer risk for this receptor is less than 1.0.

Inorganic lead was evaluated in the risk assessment for IR Site 6. Potential health effects resulting from the concentrations of lead detected at the site were evaluated using the California DTSC Lead Risk Assessment Spreadsheet (version 7.0, 1999). The estimated 99th percentile blood lead level for all residential receptors and the construction/excavation worker, based on the 95th percentile concentration of lead in soil, was below the 10  $\mu\text{g/L}$  threshold value recommended by the U.S. EPA (1993). Therefore, lead does not pose a significant threat to human health at this site.

**2.5.1 Uncertainties Associated with Risk Estimates.** Uncertainty may be introduced during various stages of the risk assessment and may have occurred as a result of any number of factors. Table 2-6 summarizes the most likely sources of uncertainty in the risk assessment for IR Site 6. Estimated risks for IR Site 6 are more likely to be overestimated than underestimated for the majority of the site because of the assumptions used in the risk assessment. In particular, use of the 95th percentile concentration for the exposure point concentration for the COPCs is a very conservative assumption (more typically, the exposure point concentration is set to the 95th percentile upper confidence level of the mean). Although this assumption leads to overestimating risk for a portion of the site (i.e., where actual concentrations are below the 95th percentile concentration), some areas within the 40-acre site pose risks above the estimated values for the site (i.e., where actual concentrations are above the 95th percentile concentration). Because the size of these areas may equal or exceed the size of a typical residential lot, the Navy has decided to conduct a removal action to protect the health of future residents and workers at the site.

**Table 2-4. Summary of Total Cancer Risks Based on the 95th Percentile Concentrations in Soil**

Receptors	Office of Environmental Health Hazard Assessment (OEHHA) Toxicity Values				U.S. EPA Toxicity Values		
	Ingestion	Dermal Contact	Inhalation	Total	Ingestion	Dermal Contact	Total
Adult (10 years)	8.2E-07	5.1E-06	3.4E-08	6.0E-06	6.8E-07	4.9E-06	1.8E-08
Adult (3 years)	2.5E-07	1.5E-06	1.0E-08	1.8E-06	2.1E-07	1.5E-06	5.3E-09
Child (10 years)	5.0E-06	1.8E-06	5.2E-08	6.8E-06	4.1E-06	1.7E-06	2.7E-08
Child (3 years)	2.3E-06	6.9E-07	2.4E-08	3.0E-06	1.9E-06	6.6E-07	1.3E-08
Full Time Occupational Worker (25 years)	7.3E-07	1.0E-06	2.0E-08	1.8E-06	6.1E-07	9.9E-07	1.1E-08
Construction/Excavation Worker (1 year)	2.0E-07	5.3E-08	5.8E-10	2.6E-07	1.7E-07	5.0E-08	3.0E-10
							2.2E-07

**Table 2-5. Summary of Total Noncancer Hazards Based on the 95th Percentile Concentrations in Soil**

Receptors	Ingestion	Dermal Contact	Inhalation	Total
Adult (10 years)	1.2E-01	6.8E-01	2.2E-03	8.0E-01
Adult (3 years)	1.2E-01	6.8E-01	2.2E-03	8.0E-01
Child (10 years)	7.1E-01	2.4E-01	3.3E-03	9.5E-01
Child (3 years)	1.1E+00	3.1E-01	5.1E-03	1.4E+00
Full Time Occupational Worker (25 years)	4.2E-02	5.5E-02	5.2E-04	9.8E-02
Construction/Excavation Worker (1 year)	2.9E-01	7.0E-02	3.7E-04	3.6E-01

**Table 2-6. Sources of Uncertainty in the Risk Assessment and Impact on Calculated Risks**

<b>Source of Uncertainty</b>	<b>Relative Level of Uncertainty</b>	<b>Impact on Calculated Risks</b>
Exposure point concentrations (for direct contact with soil)	Low. Based on measured data.	95th percentile values were used to calculate soil risks; therefore, risks are likely to be more conservative than the reasonable maximum exposure (RME) scenario defined by U.S. EPA <sup>(a)</sup> .
Exposure point concentrations (for outdoor air)	Moderate. Outdoor air concentrations for the residential and occupational receptors were estimated from particulate emission factor (PEF) and volatilization factor (VF) factors based on site-specific data and standard default assumptions.	Risks more likely to be overestimated because of conservative assumptions in the cross-media mass transfer equations, which include no biodegradation or other loss mechanism.
Site physical parameters	Moderate. Based on standard default data recommended by U.S. EPA.	Use of site-specific data is likely to increase the accuracy and reduce the uncertainty of site-specific risks estimates.
Exposure parameters for receptors	Low to Moderate. Most values are based on standard default exposure values recommended by U.S. EPA and Cal-EPA and derived from scientific studies.	Risks more likely to be overestimated because conservative default values were used. Two site-specific exposure durations were used (i.e., 3-year and 10-year) to provide a range of risks associated with the site.
Toxicity data	Moderate. Toxicity values are based on result of tests performed on animals and extrapolated to humans.	Because toxicity values are typically the most conservative values available, risks are more likely to be overestimated than underestimated.

(a) The U.S. EPA recommends combining a statistically sound, arithmetic average exposure point concentration with reasonably conservative values for exposure to determine the RME. However, because of the size of IR Site 6 (about 40 acres), an exposure point concentration based on the average concentrations at the site may not be sufficiently protective; therefore, a 95th percentile concentration was used instead as the exposure point concentration. Thus, risks based on the 95th percentile COPC concentrations likely represent an upperbound estimate of risk for the majority of the site. However, areas within the 40-acre site may pose risks above these values.

**2.5.2 Health Effects Associated with Chemicals of Concern and Threat to Nearby Human Populations and Environment.** Aroclor 1254 was determined to be the primary chemical contributing to cancer and noncancer risk levels in the risk assessment that was provided in the RSE Report (Battelle, 2001). Potential exposure to actual and potential releases of PCBs, which are probable human carcinogens, and known to cause skin conditions (e.g., acne and rashes), irritation of the respiratory system, gastrointestinal discomfort, changes in the blood and liver, and depression and fatigue, are provided by the pathways of inhalation, ingestion, and dermal contact. PCBs adsorb strongly to soil and therefore do not readily leach through the soil. They do not easily degrade and can remain in soil for years. PCBs can accumulate in the leaves and aboveground parts of plants and food crops (Agency for Toxic Substances and Disease Registry [ATSDR] 2000a).

**2.5.3 Documented Exposure Pathways.** There have been no documented exposures to PCBs in soil at Site 6.

**2.5.4 Sensitive Populations.** Populations that are sensitive or more susceptible to adverse health effects when exposed to PCBs include groups of individuals with unusually high exposure to PCBs such as certain occupational workers, subsistence fishers, farmers, breast-fed infants of mothers who consume contaminated fish or wild game, or individuals living near incinerators, PCB disposal facilities, or hazardous waste sites where PCBs have been detected (ATSDR, 2000). Based on the future plans of IR Site 6

as a residential housing area, children would be the most sensitive receptor exposed to PCBs in soil. According to ATSDR's Public Health Statement on PCBs (2000),

“Because of their smaller weight, children's intake of PCBs per kilogram of body weight may be greater than that of adults. In addition, a child's diet often differs from that of adults. A Food and Drug Administration (FDA) study in 1991 estimated dietary intakes of PCBs for infants (6 months) and toddlers (2 years) of less than 0.001 and 0.002  $\mu\text{g/kg/day}$ . Children who live near hazardous waste sites may accidentally eat some PCBs through hand-to-mouth behavior, such as by putting dirty hands or other soil/dirt covered objects in their mouths, or eating without washing their hands. Some children also eat dirt on purpose; this behavior is called pica.”

In addition, infants obtaining breast milk from mothers who have been exposed through PCB-contaminated food or water are also at greater risk because PCBs are transferred to the baby in breast milk (ATSDR, 2000).

## **2.6 Summary of Ecological Risk Assessment**

In accordance with the DTSC's *Guidance for Ecological Risk Assessment at Hazardous Waste Sites and Permitted Facilities* (DTSC, 1996), a scoping ecological risk assessment was performed to determine the potential for risk to ecological receptors at IR Site 6. The scoping assessment identifies potential ecological receptors and, if receptors exist, goes on to identify potential contaminants of concern and potentially complete exposure pathways. This assessment allows determination of whether the site poses minimal threat to ecological receptors or whether a more detailed assessment is required.

In addition to the current conditions at the site, the future land use of the site was considered in evaluating potential ecological risk. At IR Site 6, the existing housing currently is being demolished and new housing will be constructed in its place. The demolition activities will include removal of all structures, pavement, streets, and some utilities. Trees within the housing area will be preserved to the greatest extent possible; however, the site will be graded and new housing and roads constructed. Thus, the land use will remain residential with additional human disturbance.

Ecological risk assessment focuses on effects at the population, community, or ecosystem level rather than on the individual. Therefore, in evaluating potential receptors, the potential for effects at these levels are considered. Because the site has no natural habitat and the species occurring there are limited to those commonly associated with human development and occurring throughout the Mainside area, any effects resulting from exposure to contaminated soil at the site are not likely to impact these species at the population, community, or ecosystem level. The development activities at the site are expected to have a greater effect on the wildlife populations and communities than the contaminants. Therefore, the site is not considered to have any significant potential ecological receptors.

As mentioned earlier, the stormwater retention ponds and surrounding area have been developed by the Base as a Wildlife Viewing Area (see Figure 2-6). In this area, unlined ponds receive stormwater runoff from various areas of the Base, including IR Site 6, and also receive discharge from sumps installed to collect groundwater pumped from the perched aquifer at IR Site 6 for the purpose of foundation stabilization. Currently, the retention ponds have standing water year-round and thus attract wildlife (migratory birds, waterfowl, bats, coyotes, reptiles, rodents, etc.). Small fish are known to exist in the ponds. The area has been landscaped with drought-tolerant indigenous plants including mesquite, desert willow, palo verde, saltbush, and other native species. Discharge from the sumps flows into the ponds via a drainage ditch that flows through a culvert under Del Valle Road and on to the ponds. The volume of groundwater discharged from the sumps is approximately 200,000 gallons/week. Wildlife

using this area potentially could represent ecological receptors because water from IR Site 6 may reach the ponds. However, these ponds also receive stormwater from several other areas of the Base including a gas station and an auto hobby shop. In 2001, the RWQCB performed an inspection of the discharge from the sumps to the retention ponds and found the discharge to be acceptable. Groundwater samples collected from the monitoring wells near the sump in February 2001 were within levels acceptable to the RWQCB (personal communication with Robert Voorhies, MCAGCC). Thus, although migratory birds, waterfowl, and other wildlife use the water in the stormwater ponds, the discharge from the sump is not considered to represent a concern for these receptors based on sampling of sump discharge conducted by the Navy.



### Section 3.0: IDENTIFICATION OF REMOVAL ACTION OBJECTIVES

This section identifies the scope, goals, and objectives of the proposed removal action at IR Site 6. The Navy's goal for this removal action is to remove areas of near-surface soil (e.g., hot spots) with PCB concentrations at and exceeding 1 mg/kg.

#### 3.1 Statutory Framework

This removal action is taken pursuant to CERCLA and the NCP under the delegated authority of the Office of the President of the United States by Executive Order (EO) 12580. This order provides the DON with authorization to conduct and finance removal actions. The requirements for this EE/CA and its mandated public comment period provide opportunity for public input to the cleanup process. The entire process is also governed by the Federal Facility Agreement (FFA) between the DON and Cal-EPA and the RWQCB. The removal action at IR Site 6, MCAGCC is a non-time-critical removal action, because the proposed site action will be taken more than six months after commencement of the planning period. Figure 3-1 shows the proposed non-time-critical removal action process at IR Site 6.

Additionally, the Ca-HSC specifies the preparation of necessary documentation, which depends upon the costs of the removal action. The Ca-HSC requires development of either: a Remedial Action Plan for removal actions that costs \$ 1 million or greater; or a Removal Action Work Plan for removal actions that cost less than \$ 1 million. Further, the Ca-HSC authorizes DTSC to waive the RAP in favor of a RAW for removal actions when an I & SE determination exists. DTSC also may waive the RAP requirements of Ca-HSC §25356.1(d)(1) - (6), if a RAP that meets the requirements of Ca-HSC §25356.1(h)(3) is prepared. For IR Site 6, an EE/CA and a combined AM/RAP are required.

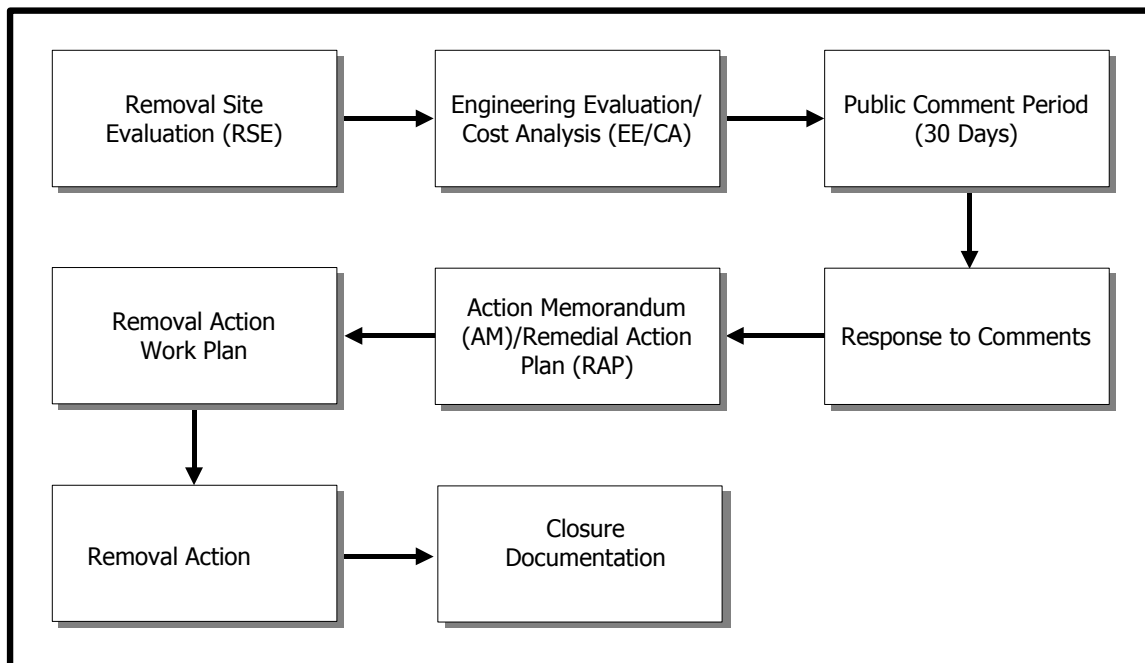


Figure 3-1. Removal Action Process at IR Site 6

The DON, with state regulatory oversight, is the lead agency for the removal action. As such, DON has final approval authority over the recommended alternative and all public participation activities with State concurrence. SWDIV, is the regional manager of the DON's CERCLA program, and therefore is providing technical expertise to conduct activities specific to the preparation of the EE/CA and the execution of the recommended alternative. The DON is working in cooperation with the Cal-EPA DTSC; the RWQCB, Colorado River Basin Region; and the public in the implementation of this removal action.

This EE/CA complies with the requirements of CERCLA, Superfund Amendments and Reauthorization Act (SARA), NCP at 40 Code of Federal Regulations (CFR) Part 300, Defense Environmental Restoration Program (DERP) at 10 United States Code (USC) §2701, *et seq.*, and Executive Order 12580. This EE/CA is being pursued under 40 CFR Part 300.415

### **3.2 Determination of Removal Scope**

Based on results presented in the RSE Report (Battelle, 2001), site risks are driven primarily by the presence of PCBs in near-surface soils. The residential housing currently at IR Site 6 is scheduled for demolition and replacement with new Base housing. Under this land use scenario, the Navy is planning to remove soils identified as hot spots during the RSE with PCB concentrations at and exceeding 1 mg/kg. The removal action is intended to be a final action for soil.

### **3.3 Determination of Removal Schedule**

Timely document reviews and concurrence between the DON and state agencies is expected to have the most significant impact on project schedules. Other issues affecting schedule include funding, completion of supporting documents, public review (i.e., community involvement), and bidding and procurement of contracted services to excavate and dispose the contaminated soils.

The Final EE/CA will be available for public review and comment for a period of 30 days. The DON will review and respond to all public comments. Significant comments will be incorporated into the AM. The AM should be finalized in the second quarter of 2002.

Engineering design based on the Final EE/CA will result in construction plans and specifications. It is expected that these plans will be available for bid shortly following completion of the AM. The removal action and site restoration activities are expected to be completed by late 2002. No long-term operation or maintenance issues are associated with the site action as it is expected to be a final action.

### **3.4 Applicable or Relevant and Appropriate Requirements**

The NCP states, "Removal actions ... shall to the extent practicable considering the exigencies of the situation, attain applicable or relevant and appropriate requirements under Federal environmental or state environmental or facility citing laws." [40 CFR 300.415(i)].

The evaluation of ARARs for this EE/CA are located in Appendix A. The following sections provide an overview of the ARARs process and a summary of those ARARs that potentially affect the development of removal action objectives.

**3.4.1 ARARs Overview.** Identification of ARARs is a site-specific determination and involves a two-part analysis: first, a determination of whether a given requirement is applicable; then if it is not applicable, if it is relevant and appropriate. A requirement is deemed applicable if the specific terms of the law or regulation directly address the chemical of concern, remedial action, or place involved at the

site. If the jurisdictional prerequisites of the law or regulation are not met, a legal requirement may nonetheless be relevant and appropriate if the site's circumstances are sufficiently similar to circumstances in which the law otherwise applies and it is well-suited to the conditions of the site.

A requirement must be substantive in order to constitute an ARAR for activities conducted onsite. Procedural or administrative requirements such as permits and reporting requirements are not ARARs.

In addition to ARARs, the NCP provides that where ARARs do not exist, agency advisories, criteria, or guidance are "to-be-considered" (TBC) useful "in helping to determine what is protective at a site or how to carry out certain actions or requirements" (55 Federal Register 8745). The NCP preamble states, however, that provisions in the TBC category "should not be required as cleanup standards because they are, by definition, generally neither promulgated nor enforceable, so they do not have the same status under CERCLA as do ARARs."

As the lead federal agency, the Navy has the primary responsibility for the identification of federal ARARs at IR Site 6. As the lead state agency, the DTSC has the responsibility for identifying State ARARs. A solicitation of state ARARs was made to DTSC by the DON on March 25, 2002. In response to this solicitation, the DTSC provided an initial list of potential chemical and location specific ARARs and TBC state guidance, criteria, and advisories. The ARARs are presented in Appendix A. DTSC stated in their response to the ARAR solicitation that additional potential ARARs and TBC would be provided by DTSC once the draft EE/CA is submitted. In addition, at this time, DTSC also would solicit ARARs from other state and local agencies.

Requirements of ARARs and TBCs are generally divided into three categories: chemical-specific, location-specific, and action-specific requirements. Chemical-specific and location-specific ARARs affecting the development of removal action objectives are discussed in Section 3.4.2. Other chemical-specific, location-specific, and action-specific ARARs are presented in Section 4.0 for each of the alternatives considered. Appendix A identifies and evaluates potential federal and State of California ARARs from the universe of regulations, requirements, and guidance and sets forth the DON determinations regarding those potential ARARs for each response action alternative retained for detailed analysis in this EE/CA report.

The ARAR evaluation includes an initial determination of whether the potential ARARs actually qualify as ARARs, and a comparison for stringency between the federal and state regulations to identify the controlling ARARs. The identification of ARARs is an iterative process. The final determination of ARARs is made by the DON in an AM, after public review, as part of the response action selection process.

**3.4.2 ARARs Affecting Removal Action Objectives.** ARARs primarily affecting removal action objectives are usually chemical- and location-specific. No promulgated chemical-specific standards for PCBs in soils are applicable at IR Site 6. However, a PCB cleanup standard for high occupancy areas of 1 mg/kg has been established for sites managed under TSCA (15 USC. §§2601–2692), 40 CFR 761.61. This cleanup standard has been identified by the Navy as relevant and appropriate for the cleanup objective at IR Site 6. Other federal and state potential chemical-specific ARARs affecting the removal objectives at IR Site 6 are associated with classification and disposal of soil generated while attaining removal action objectives. Location-specific ARARs restrict actions in certain environmentally or culturally sensitive areas. Federal and state potential location-specific ARARs affecting removal action objectives at IR Site 6 pertain to the storage, treatment, or disposal of hazardous waste within or near sensitive areas of high geological importance (e.g., faults, floodplains, salt dome formation, underground mines, and caves).

### **3.5 Removal Action Objective**

Based on CERCLA, the NCP, the risk assessment, and ARARs, the removal action objective is as follows:

- Remove areas of near-surface soil (e.g., hot spots) with PCB concentrations at and exceeding 1 mg/kg;

This removal action is expected to achieve site restoration necessary for subsequent residential use by military personnel.

#### **Section 4.0: IDENTIFICATION AND ANALYSIS OF REMOVAL ACTION ALTERNATIVES**

Based on the removal action objectives presented in Section 3.0, three alternatives have been developed for the removal action at IR Site 6. These alternatives are described in this section of the report, and are evaluated based on effectiveness, implementability, and cost. For comparison, the “no action” alternative also is evaluated as required under the NCP.

To evaluate effectiveness, consideration was given to the overall protection of human health and the environment, compliance with ARARs and other guidance, and both the long- and short-term effectiveness of the alternative. Evaluation of the implementability of each alternative included consideration of the technical feasibility, commercial availability, administrative feasibility, and public acceptance.

The cost evaluation is based upon estimates for capital costs and annual operations and maintenance costs. Capital costs include the costs for design, construction, equipment, mobilization, and decommissioning. Operations and maintenance costs include equipment rental, labor, analytical costs, transportation, and disposal fees. For this analysis, it has been assumed that all operations will be conducted by contractors at current burdened labor costs of the State of California for operators/technicians and the State of California for engineers/supervisors. Because the alternatives proposed for this site are short in duration, and do not have differing durations to completion, a present worth has not been calculated.

The primary criterion considered for identifying removal action alternatives was the current site reuse plans. Assuming a modification from the current planning is possible, institutional controls may be a cost-effective approach to reduce site risks to acceptable levels. Therefore, institution controls have been carried forward as a removal action alternative in this EE/CA.

Assuming that current plans for site reuse (i.e., residential housing) will not be modified, several in situ and ex situ treatment technologies were considered to address PCBs in shallow soils at IR Site 6. Due to the shallow depth of contamination and/or the relatively short remediation schedule associated with current site reuse plans, several technologies were eliminated from consideration (including in situ heating, soil flushing, and capping). As such, excavation of shallow soils with subsequent treatment would be necessary. The following potential treatment approaches for excavated soil have been identified:

- Off-site disposal
- Thermal desorption
- Soil washing
- Incineration
- Solvent extraction
- Base-catalyzed decomposition.

Analytical results from the RSE (Battelle, 2001) indicate that much of the near-surface soil that would need to be removed qualifies for disposal as a nonhazardous waste, thereby significantly reducing off-site disposal costs. The volume of soil (approximately 6,300 yd<sup>3</sup>) limits the cost-effectiveness of soil washing, incineration, solvent extraction, and base-catalyzed decomposition due to high costs associated with process plant setup. Additionally, initial conservative cost estimates indicate that off-site disposal would be the least expensive of the identified alternatives. Therefore, excavation with off-site disposal has been carried forward as a removal action alternative.

Three removal action alternatives for IR Site 6 were evaluated to achieve the removal action objective. A no action alternative has been included for comparison purposes. These removal action alternatives include:

- Alternative 1: institutional controls
- Alternative 2: Excavation and off-site disposal
- Alternative 3: No action.

#### **4.1 Alternative 1: Institutional Controls**

Alternative 1 consists of the implementation of institutional controls. Institutional controls are designed to restrict certain activities and/or limit access to a site, instead of eliminating the risks through active treatment. Common institutional controls include land use restrictions (e.g., zoning), regulatory controls (e.g., permitting), and access controls (e.g., fencing and signs). These controls are effective tools for promoting awareness of site risks.

##### **4.1.1 Description.** Alternative 1 consists of the following institutional controls:

- ***Land Use Restrictions*** - Land use restrictions would be incorporated into the MCAGCC Base Master Plan. These restrictions would provide a mechanism to inform Base officials of risks associated with construction and other activities at IR Site 6. As such, appropriate steps could be taken during the construction planning phases to address risks to workers and future occupants.
- ***Construction Permit Approvals*** - The existing construction permit approval process would be modified to notify Base officials prior to initiating construction activities at IR Site 6.
- ***Physical Barriers*** - Fencing would be used to surround the area and limit site access. This would minimize the potential for contact with or exposure to near-surface soil.
- ***Signs and Public Education*** - Signs would be posted along the fence perimeter to notify the public about the risk of exposure to site chemicals. Signs would include information regarding site access restrictions, site contacts, and other relevant site-specific information.

It is assumed that the existing buildings at IR Site 6 would be demolished prior to implementation of this action. Under this alternative, the site could not be redeveloped for residential use.

##### **4.1.2 Effectiveness.** The potential for exposure to PCBs and other constituents of concern in near-surface soil would remain under Alternative 1. However, the use of institutional controls would be protective of human health because primary exposure routes would be controlled.

The federal and state action-specific ARARs for Alternative 1 Institutional Controls are summarized in Appendix A. The chemical and location-specific ARARs for IR Site 6 also are detailed in Appendix A. There are no federal ARARs for institutional controls. However, the U.S. EPA and the Navy have issued guidance relating to the development of an institutional controls program. As summarized in Appendix A, Table A4-2, several state ARARs include requirements for institutional controls (e.g., provisions of the California Civil Code and the Ca-HSC). These state ARARs would have to be

considered in the development of an institutional controls plan. Because the maximum level of PCBs found at IR Site 6 is approximately 8 mg/kg, IR Site 6 would meet the TSCA low occupancy standards with the institutional controls alternative.

Alternative 1 would be effective in the long-term and short-term, assuming the site would not be redeveloped for residential use. However, because the Base is planning to build new residential housing at IR Site 6, institutional controls would not be effective because PCBs would remain in the soil at levels greater than 1 mg/kg.

**4.1.3 Implementability.** Institutional controls are both technically and administratively feasible at IR Site 6 and the services and materials necessary to implement Alternative 1 are readily available. Technical feasibility issues have limited applicability to this alternative since a remedial technology or process is not involved. Possible technical considerations include long-term maintenance of the fence and signs. Administrative issues associated with Alternative 1 include implementing procedures and protocols that would modify the Base Master Plan and construction permit approval process. Because this alternative requires that IR Site 6 not be redeveloped for residential land use, which deviates from the MCAGCC current planning, administrative difficulties are likely. New locations for the planned residential housing would need to be identified and negotiated, existing plans and contracts would need to be addressed. Therefore, although Alternative 1 is technically administratively feasible, administrative issues associated with modifying planned land use would limit the implementability of institutional controls at IR Site 6. Community acceptance and state agency concurrence also are part of implementability and will be addressed in the AM following the public comment period on the EE/CA.

**4.1.4 Cost.** Table 4-1 summarizes the estimated costs for Alternative 1: Institutional Controls. The capital cost for equipment (i.e., perimeter fencing and signs) is estimated to be approximately \$97,000. The professional labor required to complete the project includes the development of an institutional controls plan, project design, equipment procurement, and project oversight. The engineering and administrative costs are estimated to be approximately \$25,000. Long-term operation and maintenance (O&M) costs for institutional controls are not included because it is assumed that MCAGCC would implement the security and maintenance activities as part of routine Base operations. The total cost of the Alternative 1 is estimated at \$122,000.

**Table 4-1. Summary of Costs for Alternative 1: Institutional Controls**

Item	Unit Cost	Quantity	Total Cost
<b>Purchased Equipment (PE) Costs</b>			
Fencing (Schedule 40, Galvanized Steel, 6 ft high)	15.45 \$/ft <sup>(a)</sup>	6,080 ft	\$94,000
Gate	\$280 ea. <sup>(a)</sup>	8	\$2,200
Signage	\$50 ea.	16	\$800
<b>Professional Labor</b>			
Engineering (Institutional Controls Plan, Design, Procurement)	10% PE	NA	\$10,000
Construction and Field Expenses	10% PE	NA	\$10,000
Administration, Contractor Fees, and Contingencies	5% PE	NA	\$5,000
<b>Total Cost</b>			<b>\$122,000</b>

(a) Includes costs for installation labor, overhead, and profit by subcontractor.

## 4.2 Alternative 2: Excavation and Off-Site Disposal

Alternative 2 consists of the excavation of contaminated soil and disposal in an off-site landfill. Under this alternative, near-surface soil containing PCBs greater than or equal to 1 mg/kg would be excavated and transported to a waste disposal facility.

**4.2.1 Description.** Based on PCB analytical data presented in the RSE Report (Battelle, 2001), approximately 6,300 yd<sup>3</sup> of soil contain PCB concentrations greater than or equal to 1 mg/kg. Figure 4-1 shows the proposed areas for soil excavation. The proposed areas for soil excavation consist of a 70-ft by 70-ft square by 1-ft-deep (except location L4, which represents 0 to 2 ft bgs) centered around each RSE sampling location that contained PCBs at levels greater than or equal to 1 mg/kg (32 locations). Confirmation sampling would be conducted to verify the effectiveness of the removal action.

Following excavation, the soil will be stockpiled on site and classified according to U.S. EPA publication SW-846 (Test Methods for Evaluating Solid Waste, Physical/Chemical Methods). A soil stabilizer will be used to prevent erosion of the stockpiled soil. The stockpiled soil would be disposed of at a Resource Conservation and Recovery Act (RCRA)-hazardous waste facility, a California-hazardous waste facility, and/or a Class III landfill as appropriate based on classification of the generated wastes. Figure 4-2 is a waste management flow chart that optimizes sampling requirements and identifies soil disposition based on the analytical results of stockpile sampling. Table 4-2 provides waste classification values including total threshold limit concentration (TTLC), soluble threshold limit concentration (STLC), toxicity characteristic leaching procedure (TCLP), RCRA soil treatment standard, and RWQCB-designated waste concentration for each compound.

Earthwork would be planned and conducted to minimize the exposure duration of unprotected soils. Soil erosion would be mitigated with dust control measures and surface runoff control measures during the project. The soil at the site, haul roads, and other areas disturbed by operations would be treated with dust suppressants (e.g., water) as necessary. The use of dust control measures and work practices would prevent the unplanned exposure of any persons to hazardous substances. Trucks hauling excavated soil to off-site disposal locations would be covered to prevent any spread of dust. Surface water/stormwater control measures may include the construction of diversion ditches, benches, and berms.

It is estimated that approximately 315 truckloads of soil would be hauled off site (6,300 yd<sup>3</sup> total at 20 yd<sup>3</sup> per truck). It is estimated that approximately four personnel vehicles would be used for project contractors. All vehicles when not in use would be parked on site. Truck and other vehicle trips would be timed to avoid peak traffic hours. Traffic in the area is light to moderate; varying with peak morning and evening commuting times and also varying due to scheduled training activities at the Base.

The project would not require heavy equipment larger than the 20-yd<sup>3</sup> capacity trucks for hauling excavated soil and the backhoes and loaders for excavation. It is not anticipated that project construction or operation would exceed 65 dBA Community Noise Equivalent Level (CNEL) at any residential dwelling; 70-dBA CNEL at offices, schools, hospitals, churches, and similar properties; and 75 dBA Leq for industrial use facilities. However, hazardous noise signs would be posted wherever equipment and work procedures produce sound levels greater than 84 dBA (29 CFR 1910.95). Construction workers would wear ear protection as required in accordance with the Site-Specific Health and Safety Plan (HASP).



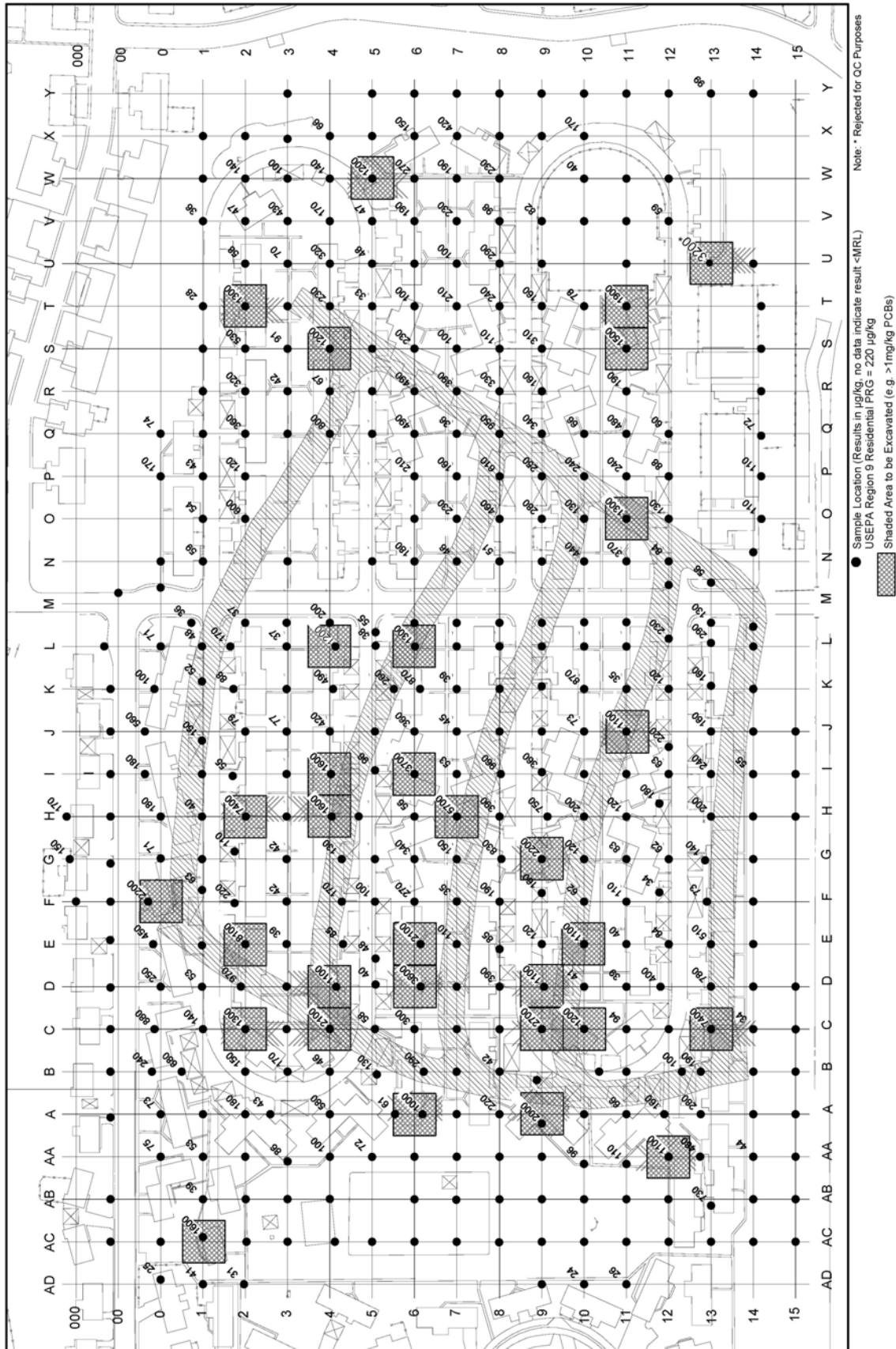
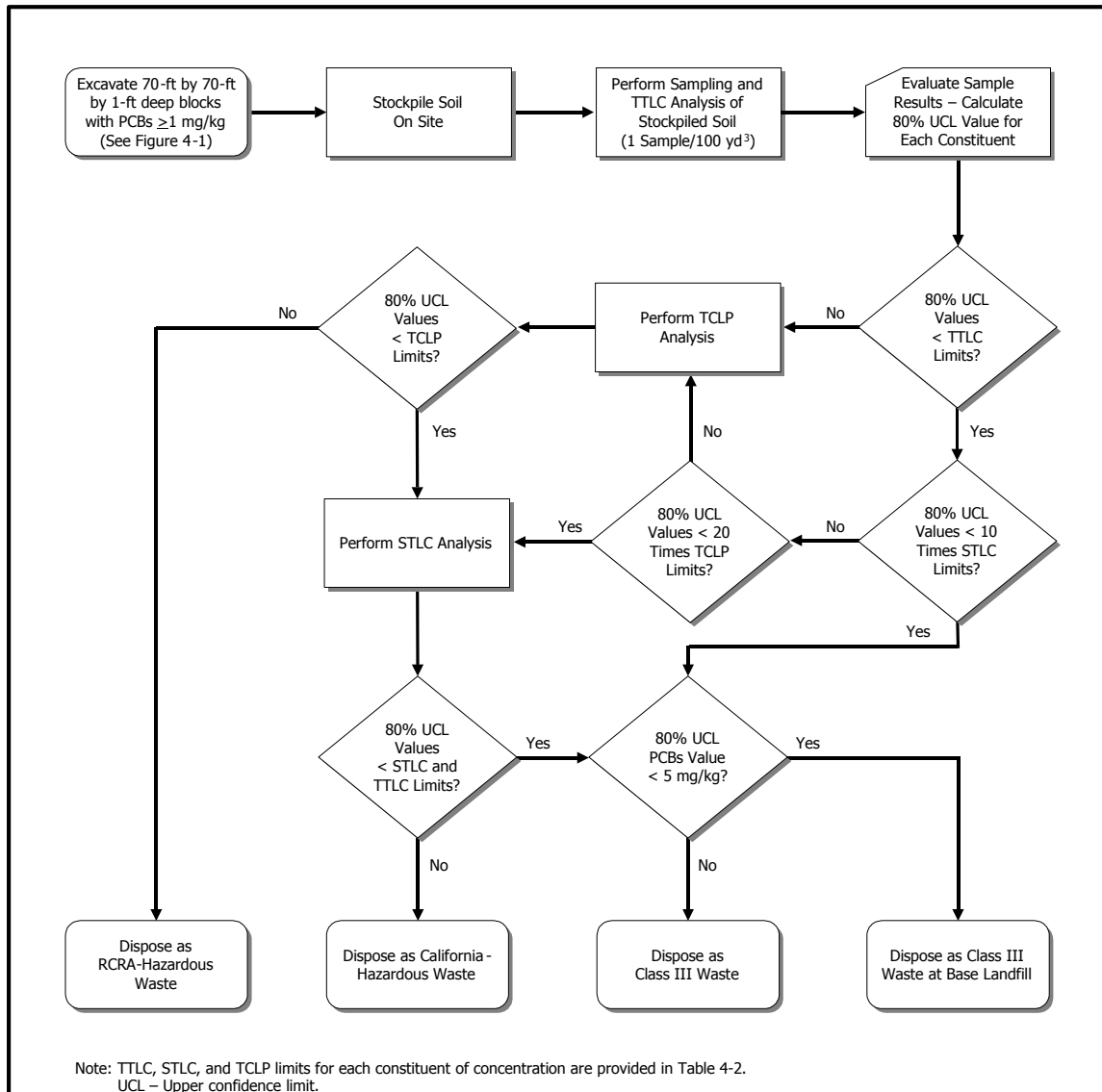


Figure 4-1. Proposed Areas for Soil Excavation



**Figure 4-2. Waste Management Flowchart**

**4.2.2 Effectiveness.** Excavation and off-site disposal would be protective of human health because the PCB-impacted soils would be removed. Correspondingly, the human health risk and the mobility of the constituents of concern in the environment would be reduced. Although, this alternative does not permanently reduce the volume or toxicity of the contaminants in the excavated soil, it does reduce their mobility through placement in approved engineered landfills.

Appendix A provides tables of federal and state action-specific ARARs related to excavation and off-site disposal. The ARARs relating to excavation and off-site disposal deal primarily with waste classification, temporary storage of wastes, transport, waste disposal, and fugitive emissions from construction activities.

**Table 4-2. Waste Classification Levels**

Compound	RCRA Hazardous Waste			California-Hazardous Waste		RWQCB Designated Waste (mg/kg)
	RCRA Waste Code	TCLP Limit (mg/L)	RCRA Soil Treatment Standard <sup>(a)</sup> (mg/kg)	TTLCLimit (mg/kg)	STLCLimit (mg/L)	
Organics						
Aldrin	P004	NA	0.66	1.4	0.14	NA
Chlordane	D020	0.03	2.6	2.5	0.25	NA
DDT	U060	NA	0.87	1	0.1	NA
DDE	U060	NA	0.87	1	0.1	NA
DDD	U060	NA	0.87	1	0.1	NA
Dieldrin	P037	NA	1.3	8	0.8	NA
Heptachlor	D031	0.008	0.66	4.7	0.47	NA
PCBs	NA	NA	NA	50	5	5
Inorganics						
Antimony	NA	NA	NA	500	15.0	NA
Arsenic	D004	5.0	50 mg/L	500	5.0	NA
Barium	D005	100	210 mg/L	10,000	100	NA
Beryllium	NA	NA	NA	75	0.75	NA
Cadmium	D006	1.0	1.1 mg/L	100	1.0	NA
Chromium (total)	D007	5.0	6.0 mg/L	2,500	5.0	NA
Chromium (III)	NA	NA	NA	2,500	5.0	NA
Chromium (VI)	NA	NA	NA	500	5.0	NA
Cobalt	NA	NA	NA	8,000	80	NA
Copper	NA	NA	NA	2,500	25	NA
Lead	D008	5.0	7.5 mg/L	1,000	5.0	NA
Mercury	D009	0.2	0.25 mg/L	20	0.2	NA
Molybdenum	NA	NA	NA	3,500	350	NA
Nickel	NA	NA	NA	2,000	20	NA
Selenium	D010	1.0	57 mg/L	100	1.0	NA
Silver	D011	5.0	1.4 mg/L	500	5.0	NA
Thallium	NA	NA	NA	700	7.0	NA
Vanadium	NA	NA	NA	2,400	24	NA
Zinc	NA	NA	NA	5,000	250	NA

(a) Under Alternate Treatment Standards for Soils (40 CFR 268.49) ONLY 10 X universal treatment standard (UTS) must be met.

NA= not applicable.

A determination of the hazardous waste classification would be made at the time the wastes (e.g., excavated soil) are generated. If the contaminated soil is determined to be a hazardous waste, it must be disposed of in an appropriate landfill and will be subject to land disposal restrictions (LDRs) as specified under the federally authorized State of California RCRA program. A waste determined not to be a RCRA hazardous waste may still be considered state-regulated. The state hazardous waste classifications can be more stringent and are specified in 22 California Code of Regulations (CCR) 66261.24(a)(2), which lists the TTLCL and the STLCL values for state-regulated, non-RCRA hazardous

waste. In addition, nonliquids with PCB concentrations above 5 mg/kg are considered a designated waste (i.e., a nonhazardous waste that could cause degradation of surface or groundwater) by the RWQCB, Colorado River Basin Region.

Excavated soil would be stockpiled in lined and bermed stockpile areas prior to off-site disposal as required by the DTSC and Mojave Desert Air Quality Management Board (MDAQMD). A soil stabilizer will be used to prevent erosion of the stockpiled soil. If stockpiled soil is classified as a RCRA-hazardous waste, it would be managed according to 40 CFR Section 264.554. State-regulated, non-RCRA hazardous soil would be stockpiled and managed according to the provisions in Division 20, Chapter 6.5, Section 25123.3 of the Ca-HSC.

Fugitive dust may be generated during the excavation and handling of the contaminated soil. Rules 401 and 403 promulgated by the MDAQMD are considered ARARs for these activities. These rules require the use of control measures (e.g., spraying with water) to prevent fugitive-dust emissions.

In addition, the excavation of near-surface soils with elevated PCB levels (e.g.  $\geq 1$  mg/kg) would comply with TSCA as outlined in 40 CFR 761.125. Excavation and off-site disposal of the impacted soil would allow for unrestricted use of the property.

In the long-term, excavation and off-site disposal would be effective because it would reduce the human health risk, reduce the mobility of the contaminants in the environment, and allow for unrestricted use of the property. In the short-term, excavation and off-site disposal would be effective because engineering controls would be used so that the excavation, transport, and disposal of the wastes would not present substantive risks to site workers or members of the public. In addition, cleanup levels would be achieved in a short time frame and allow for unrestricted use of the property. Unrestricted use is defined under 40 CFR 761.123; however, for IR Site 6, the term unrestricted implies the use of the land for residential purposes.

**4.2.3 Implementability.** Excavation with off-site disposal is a mature remedial technology. Surface soil removal would be easily accomplished with conventional, readily available equipment and contractors. Also, multiple disposal facilities are available to accept the wastes generated at the site. The scheduled demolition of existing buildings at IR Site 6 prior to the removal action would further simplify implementation due to increased site access and decreased potential for utility disruptions. Potential impacts on the areas surrounding IR Site 6 would be minimal and issues such as dust control are regulated and control measures would be implemented. Administratively, Alternative 2 meets NCP and Ca-HSC definitions for non-time-critical removal actions (see Section 3.1 of this report) and the planned reuse of this property would not be modified. Although permits are not required for CERCLA removal actions, substantive requirements of the permits will be addressed to conduct the removal action. However, the procedures are commonly implemented and well understood. Therefore, Alternative 2 excavation and off-site disposal is technically and administratively feasible. Community acceptance and state agency concurrence also are part of implementability and will be addressed in the AM following the public comment period on the EE/CA.

**4.2.4 Cost.** It is estimated that approximately 10,400 tons, or 6,300 yd<sup>3</sup>, would be excavated and removed from IR Site 6. The detailed components of the cost estimate for Alternative 2 are presented in Table 4-3. The estimated cost for site preparation, soil excavation, soil loading, and site grading is approximately \$272,500. The estimated cost for the laboratory analysis needed for waste classification and post-verification sampling for PCBs is \$110,300. The estimated cost for the transport and disposal of the excavated soil is \$551,200. Professional labor, estimated at \$325,500, would include the design of waste stockpiles, stormwater management, waste classification, report preparation, field oversight, and project management. The total project cost is estimated to be approximately \$1,259,500.

**Table 4-3. Summary of Costs for Alternative 2: Excavation and Off-Site Disposal**

Item	Unit Cost	Quantity	Total Cost
<b>Site Work (SW)</b>			
Mobilization	\$15,000	1	\$15,000
Site preparation	\$238 per acre	40 acres	\$9,500
Excavation (common earth shovel, 3 yd <sup>3</sup> bucket)	\$8.25 per yd <sup>3</sup>	6,300 yd <sup>3</sup>	\$52,000
Loading (common earth shovel, 3 yd <sup>3</sup> bucket) <sup>(e)</sup>	\$8.25 per yd <sup>3</sup>	6,300 yd <sup>3</sup>	\$52,000
Grading	\$0.72 per yd <sup>2</sup>	200,000 yd <sup>2</sup>	\$144,000
<b>Subtotal</b>			<b>\$272,500</b>
<b>Waste Classification (WC)</b>			
TCLP for metals	\$190	67	\$12,700
TCLP for pesticides	\$200	67	\$13,400
TTLC for metals	\$160	67	\$10,700
TTLC for pesticides	\$200	67	\$13,400
TTLC for PCBs	\$200	67	\$13,400
STLC for metals	\$190	67	\$12,700
STLC for pesticides	\$200	67	\$13,400
STLC for PCBs	\$200	67	\$13,400
Post-verification (PCBs)	\$200	36	\$7,200
<b>Subtotal</b>			<b>\$110,300</b>
<b>Off-Site Disposal (OD)</b>			
MCAGCC landfill	\$5.00 per ton	3,500 tons <sup>(a)</sup>	\$17,500
Non-hazardous landfill	\$43.65 per ton <sup>(a)</sup>	2,300 tons	\$100,400
Cal-hazardous waste	\$82.60 per ton <sup>(b)</sup>	2,300 tons	\$190,000
RCRA-hazardous waste	\$105.8 per ton <sup>(b)</sup>	2,300 tons	\$243,300
<b>Subtotal</b>			<b>\$551,200</b>
<b>Professional Labor</b>			
Engineering	10% SW + WC + OD	NA	\$93,000
Construction and field expenses	10% SW + WC + OD	NA	\$93,000
Contractor fees and Contingencies	10% SW + WC + OD	NA	\$93,000
Administration	5% SW + WC + OD	NA	\$46,500
<b>Subtotal</b>			<b>\$325,500</b>
<b>Total</b>			<b>\$1,259,500</b>

(a) Assumes round-trip for dump truck is 10 miles and each truck holds 20 yd<sup>3</sup>.

This cost estimate is based on the following assumptions:

- Calculations assume 5% bulking factor and soil density of 1.65 tons/yd<sup>3</sup>.
- One soil sample would be collected for every 100 yd<sup>3</sup>.
- Five percent bulking factor
- One soil sample would be collected for every 100 yd<sup>3</sup>
- Duplicate samples would be collected for quality control (10%).

- Laboratory analysis to include TCLP for metals and pesticides, TTLC for metals, pesticides, and PCBs, and STLC for metals, pesticides, and PCBs.
- Estimated 2,300 tons of RCRA-hazardous waste.
- Estimated 2,300 tons of California hazardous waste.
- Estimated 2,300 tons of Class III waste for an off-site landfill.
- Estimated of 3,500 tons of Class III waste suitable for the MCAGCC landfill.

#### **4.3 Alternative 3: No Action**

Alternative 3 is a no action alternative whereby the site will remain intact.

**4.3.1 Description.** A no action alternative would leave soil containing PCBs equal to or greater than 1 mg/kg in place and would not restrict certain activities and/or limit access to a site, or eliminate the risks through active treatment. Under this alternative, the site could not be redeveloped for residential use.

**4.3.2 Effectiveness.** The potential for exposure to PCBs and other constituents of concern in near-surface soil would remain under Alternative 3.

The federal and state chemical- and location-specific ARARs for Alternative 3 are summarized in Appendix A. There are no federal or state action-specific ARARs for a no action alternative. Because the maximum level of PCBs found at IR Site 6 is approximately 8 mg/kg, IR Site 6 would meet the TSCA low occupancy standards with the no action alternative.

Alternative 3 would not be effective, assuming the site will be developed for residential use, because PCBs would remain in the soil at levels that exceed 1 mg/kg.

**4.3.3 Implementability.** A no action alternative would be easy to implement because technical feasibility issues are not applicable to this alternative since a remedial technology or process is not involved. In addition, no administrative issues would be directly associated with Alternative 3 because procedures and protocols that would modify the Base Master Plan and construction permit approval processes are not associated with this alternative. However, this alternative would not allow IR Site 6 to be redeveloped for residential land use, which deviates from the MCAGCC current planning; therefore Alternative 3 would indirectly be associated with administrative issues. For instance, new locations for the planned residential housing would have to be identified and negotiated, and existing plans and contracts would need to be addressed. Therefore, although Alternative 3 is technically administratively feasible, administrative issues associated with modifying planned land use would limit the implementability of a No Action alternative at IR Site 6. Community acceptance and state agency concurrence also are part of implementability and will be addressed in the AM following the public comment period on the EE/CA.

**4.3.4 Cost.** There is no cost associated with Alternative 3.

## **Section 5.0: COMPARATIVE ANALYSIS OF REMOVAL ACTION ALTERNATIVES**

In this section, the alternatives analyzed in Section 4.0 are compared against each other in order to evaluate the relative performance of each alternative in relation to each of the criteria and specifies the basis for rejection of an alternative. The criteria used in this comparison are the same as in Section 4.0, namely effectiveness, implementability, and cost. Table 5-1 summarizes the effectiveness, implementability, and cost issues relating to the three alternatives.

### **5.1 Effectiveness of Alternatives**

Alternatives 1, 2, and 3 would be protective of human health and the environment and would comply with ARARs. However, under Alternatives 1 and 3, soil containing PCBs equal to or greater than 1 mg/kg would remain in place for an indefinite period and limit land reuse options. Alternative 2 would effectively reduce site risks by removing soils with the highest PCB levels and the mobility of PCBs would be reduced through placement in an engineered landfill. Also, Alternatives 1, 2 and 3 could be implemented so that no substantive risks are presented to site workers or the surrounding community.

### **5.2 Implementability of Alternatives**

Execution of all three alternatives is technically feasible and relatively easy to implement. Alternatives 1 and 3 do not require specialized equipment or contracting and all of the activities could be accomplished by Base personnel and local contractors. Similarly, excavation contractors and disposal facilities necessary to implement Alternative 2 are readily available. However, administratively, Alternatives 1 and 3 would be much more difficult to implement than Alternative 2, because the planned land use would need to be modified. As such, new locations for the residential housing would need to be identified and negotiated, existing plans and contracts would need to be modified, and environmental concerns at new locations would need to be addressed. Excavation with off-site disposal would not require modification of planned land use. Administrative issues associated with Alternative 2 include contracting, permitting, and project oversight activities.

### **5.3 Cost of Alternatives**

Regarding cost, Alternative 1 is substantially less expensive to implement than Alternative 2, and Alternative 3 has no cost associated with it. However, the cost estimates for Alternative 1 and 3 does not account for the ramifications of changing the planned land use at IR Site 6. These costs include identifying a new site, modifying existing contracts, and evaluating environmental impacts at the new site. Also, leaving PCB-impacted soil in place results in potential future liabilities.

**Table 5-1. Comparison of Removal Action Alternatives**

<b>Action</b>	<b>Effectiveness</b>				<b>Implementability</b>		<b>Cost</b>
	<b>Protection of Human Health and the Environment</b>	<b>Compliance with ARARs</b>	<b>Long-Term Effectiveness</b>	<b>Short-Term Effectiveness</b>	<b>Technical Feasibility</b>	<b>Administrative Feasibility</b>	
Alternative 1: Institutional Controls	Provides protection by limiting exposure at the site.	Can be implemented to comply with ARARs.	Not effective. Chemicals remain in soil for an indefinite period, resulting in potential future liabilities.	Does not present substantive risks to site workers or community in short term.	Easily implemented. Implementation would require land use restrictions, permit approvals, fencing, and warning signs.	Difficult to administer. Planned land use would need to be modified and a new Base housing location would have to be identified and negotiated; existing plans and contract modified.	\$122,000
Alternative 2: Excavation and Off-Site Disposal	Site human health risk decreased by removal of impacted soil.	Can be implemented to comply with ARARs.	Effectively reduces site risk. Does not reduce volume or toxicity of chemicals, but reduces mobility through placement in an engineered landfill.	Does not present substantive risks to site workers or community in short term.  Generally involves relatively short time frame to conduct removal action.	Easily implemented. Excavation contractors and disposal facilities are readily available.	Consistent with planned land use at IR Site 6. Administrative issues during implementation include contracting, permitting, and project oversight activities.	\$1,259,500
Alternative 3: No Action	Provides protection by limiting exposure at the site, if the site is a designated a low occupancy area.	Can be implemented to comply with ARARs.	Not effective. Chemicals remain in soil for an indefinite period, resulting in potential future liabilities.	Does not present substantive risks to site workers or community in short term.	Easily implemented.	Difficult to administer. Planned land use would need to be modified and a new Base housing location would have to be identified and negotiated; existing plans and contract modified.	\$0



## **Section 6.0: RECOMMENDED REMOVAL ACTION ALTERNATIVE**

The EE/CA was performed in accordance with current U.S. EPA and U.S. Navy guidance documents for a non-time-critical removal action under CERCLA. The purpose of this EE/CA was to identify and analyze alternative removal actions to address PCB-contaminated soil at IR Site 6 at MCAGCC Twentynine Palms, CA. Three alternatives were identified, evaluated, and compared:

- Alternative 1: Institutional controls;
- Alternative 2: Excavation and off-site disposal; and
- Alternative 3: No action.

Based on the comparative analyses of the removal action alternatives completed in Section 5.0, the recommended removal action is Alternative 2, excavation and off-site disposal. Under this alternative, near-surface soil containing PCBs greater than or equal to 1 mg/kg would be excavated and transported to a waste disposal facility. The proposed areas for soil excavation consist of a 70-ft by 70-ft square centered around each RSE sampling location that contained PCBs greater than or equal to 1 mg/kg. A total of 6,300 yd<sup>3</sup> soil would be removed from the site.

This alternative is recommended because future land use plans for this site include redevelopment of the property for residential use, excavation and off-site disposal allows for unrestricted land use and is protective of human health. Excavation with off-site disposal complies with ARARs. This removal action would be easily implemented and cleanup levels would be achieved in a relatively short time frame. Although the initial cost for implementation of Alternative 1 is lower, the planned redevelopment and potential liability related to leaving PCB-impacted soil on site make excavation and off-site disposal the preferred alternative.

Prior to conducting the removal action, the Navy will prepare a work plan to document site-specific activities, including excavation, waste disposal, scheduling, quality control, health and safety, site surveys, and sampling and analysis.

## Section 7.0: REFERENCES

- ATSDR. Agency for Toxic Substances and Disease Registry. 2000. Toxicological Profile for Polychlorinated Biphenyls (PCBs). Prepared by Syracuse Research Corporation Under Contract No. 205-1999-00024. November.
- Battelle. 1999. *Revised Workplan for Site 6 and Site 24. Natural Resources/Environmental Affairs Directorate, Marine Corps Air Ground Combat Center, Twentynine Palms, California*. Contract No. N47408-95-D-0730, Delivery Order No. 0062. Letter to Mr. Cristobal Gonzalez with/ECC workplan attached. December 9.
- Battelle. 2000a. Final Letter Report for Metals and PCBs Sampling at IR Site 6. Natural Resources/Environmental Affairs Directorate, Marine Corps Air Ground Combat Center, Twentynine Palms, California. Contract No. N47408-95-D-0730, Delivery Order No. 0062. January 17.
- Battelle. 2000b. *Final Workplan for Evaluation and Assessment of Installation Restoration Site 6 for PCB and Metals in Soil*. Prepared for Natural Resources/Environmental Affairs Directorate, Marine Corps Air Ground Combat Center, Twentynine Palms, California. Contract No. N47408-95-D-0730, Delivery Order No. 0116. June 16.
- Battelle. 2001. Removal Site Evaluation Report for Installation Restoration Site 6 at Marine Corps Air Ground Combat Center, Twentynine Palms, California. September 20.
- Battelle, Earth Tech, Inc., and NewFields, Inc. 2001. Draft Final Guidance for Environmental Background Analysis. Volume I: Soil. Prepared for NAVFAC. August 10
- Brown and Caldwell. 1985. *Initial Assessment Study of Marine Corps Air Ground Combat Center, Twentynine Palms, California*. Naval Energy and Environmental Support Activity (NEESA) 13-076. Navy Assessment and Control of Installation Pollutants (NACIP) Department. Port Hueneme, CA.
- California Department of Fish and Game. 2001. "California Wildlife Habitat Relationships System." <http://www.dfg.ca.gov/whdab/R005.html>. March 6.
- California Department of Toxic Substance Control. 1996. Guidance for Ecological Risk Assessment at Hazardous Waste Sites and Permitted Facilities. Part B: Scoping Assessment. July.
- California Environmental Protection Agency. 1997. Selecting Inorganic Constituents as Chemicals of Potential Concern at Risk Assessments at Hazardous Waste Sites and Permitted Facilities. Prepared by the Human and Ecological Risk Division, DTSC, Sacramento, CA. February.
- California Native Plant Society. 2001. "CNPS Inventory, 6th Edition." <http://www.cnps.org/rareplants/inventory/6thEdition.htm>. 10 January.
- CDFG, see California Department of Fish and Game.
- CDM Federal Programs Corporation. 1995. Draft Letter Report: *December 1994 Groundwater Monitoring Results for IRP Sites 2, 6 and 7 for Marine Corps Air Ground Combat Center Twentynine Palms, CA*. Prepared for Southwest Division, Naval Facilities Engineering Command, under Navy Contract No. N68711-92-D-4672, Delivery Order No. 6201-011. January 14.

CNPS, see California Native Plant Society.

DTSC, see California Department of Toxic Substances Control.

Environmental Chemical Corporation. 1997a. *Draft Engineering Evaluation/Cost Analysis (EE/CA) and Corrective Action Plans (CAP) for Remedial Action Support At 6 Contaminated Sites At Marine Corps Air Ground Combat Center (MCAGCC), Twenty-Nine Palms, California*. Prepared for U.S. Army Corps of Engineers, Los Angeles District, Inland Resident Office, 5023 4th Street, Bldg. 2640, March Air Reserve Base, California 92618. Contract No. DACW05-95-D-0014, Delivery Order No. 0007. January 10.

Environmental Chemical Corporation. 1997b. Revised Workplan for Site 6 and Site 24, Remedial Action Support at 6 Contaminated Sites, Marine Corps Air Ground Combat Center (MCAGCC) Twenty-Nine Palms, California. Prepared for U.S. Army Corps of Engineers, Los Angeles District, Inland Resident Office, 5023 4th Street, Bldg. 2640. Contract No. DACW05-95-D-0014, Delivery Order No. 0007. August 27

Jacobs Engineering Group, Inc. 1995. Draft Final Background Study. Volume IV. Prepared by Southwest Division Naval Facilities Engineering Command, San Diego, California. Contract No. N68711-89-D-9296, CTO No. 0201, Document Control No. CLE-J02-01F201-B6-0006. January.

Jacobs Engineering Group, Inc. 1996. *Final Site Inspection Report, Site 6: Army Sludge Beds and Percolation Ponds*. Volume XVI. Prepared by Southwest Division Naval Facilities Engineering Command, San Diego, California. Contract No. N68711-89-D-9296, CTO No. 0201, Document Control No. CLE-J02-01F201-B6-0007. March.

JEG, see Jacobs Engineering Group, Inc.

Londquist and Martin. 1989. *Geohydrology and Ground-Water-Flow Simulation of the Surprise Spring Basin Aquifer System, San Bernardino County, California*. U.S. Geological Survey, Water Resources Investigation Report 89-4099. 41 pp.

Skinner, M.W., and B.M. Pavlik. 1994. Inventory of Rare and Endangered Vascular Plants of California. California Native Plant Society, Special Publication No. 1, 5th edition.

Southwest Division Naval Facilities Engineering Command. 1998. Draft EA for Proposed Demolition, Construction, and Revitalization of Military Family Housing, MCAGCC Twentynine Palms, CA.

Southwest Division Naval Facilities Engineering Command. 2001. Environmental Assessment Proposed Military Family Housing at Marine Corps Air Ground Combat Center Twentynine Palms. Department of the Navy, Navy Facilities Engineering Command Southwest Division. March 2001.

SWDIV, see Southwest Division Naval Facilities Engineering Command.

U.S. EPA, see United States Environmental Protection Agency.

U.S.G.S, see United States Geological Survey.

- United States Environmental Protection Agency. 1993. Guidance in conducting Non-Time Critical Removal Actions Under CERCLA. EPA/540/R-95/057/August.
- United States Environmental Protection Agency. 1994. Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. February.
- United States Environmental Protection Agency. 1996. EPA SW 846 Third Edition, Test Methods for Evaluating Solid Waste. December.
- United States Environmental Protection Agency. 2000a. *Region 9 Preliminary Remediation Goals (PRGs) Table*. Available at the internet web address: <http://www.epa.gov/region09/waste/sfund/prg/index.html>. Updated November 22
- United States Geological Survey. 2002. Personal communication with Pete Martin, Clinton Church, and John Izbecki of the U.S.G.S., Walter Resources Division, San Diego, CA. April 29, 2002.

## **APPENDIX A**

### **APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)**

## CONTENTS

TABLES.....	A-iii
ACRONYMS/ABBREVIATIONS.....	A-iv
Section A1: INTRODUCTION.....	A-1
A1.1 Summary of CERCLA and NCP Requirements.....	A-1
A1.2 Methodology Description.....	A-1
A1.2.1 General.....	A-1
A1.2.2 Identifying and Evaluating Federal ARARs.....	A-2
A1.2.3 Identifying and Evaluating State ARARs.....	A-3
A1.2.3.1 Solicitation of State ARARS Under NCP.....	A-3
A1.2.3.2 Chronology of Efforts To Identify State ARARS.....	A-3
A1.3 Other General Issues.....	A-3
A1.3.1 General Approach to Requirements of the Federal Resource Conservation and Recovery Act.....	A-3
A1.4 Waste Characterization.....	A-4
A1.4.1 RCRA Hazardous Waste Determination.....	A-4
A1.4.2 California-Regulated, Non-RCRA Hazardous Waste.....	A-7
A1.4.3 Other California Waste Classifications.....	A-7
Section A2: CHEMICAL-SPECIFIC ARARS.....	A-8
A2.1 Summary of ARARS Conclusions by Medium.....	A-8
A2.1.1 Soil ARARs Conclusions.....	A-8
A2.1.2 Air ARARs Conclusions.....	A-15
A2.2 Detailed Discussion of ARARS by Medium.....	A-15
A2.2.1 Soil ARARS.....	A-15
A2.2.1.1 Federal.....	A-15
A2.2.1.2 State.....	A-16
A2.2.2 Air ARARS.....	A-17
Section A3: LOCATION-SPECIFIC ARARS.....	A-18
A3.1 Summary of Location-Specific ARARS.....	A-18
A3.1.1 Floodplain Management Conclusions.....	A-18
A3.1.2 Geologic Characteristics Conclusions.....	A-18
A3.2 Detailed Discussion of ARARS.....	A-18
A3.2.1 Floodplains Management ARARS.....	A-22
A3.2.1.1 Federal.....	A-22
A3.2.1.2 State.....	A-22
A3.2.2 Geologic Characteristics ARARS.....	A-22
A3.2.2.1 Federal.....	A-22
A3.2.2.2 State.....	A-23
Section A4: ACTION-SPECIFIC ARARS.....	A-24
A4.1 Alternative 1 - Institutional Controls.....	A-24
A4.1.1 Institutional Controls.....	A-24
A4.2 Alternative 2 – Excavation And Off-Site Disposal.....	A-43
A4.2.1 Federal ARARs.....	A-43
A4.2.2 State ARARs.....	A-44
A4.2.3 Conclusions.....	A-44
A4.3 Alternative 3 – No Action.....	A-44

**CONTENTS**  
**(Continued)**

Section A5: SUMMARY .....	A-45
Section A6: REFERENCES .....	A-46

**TABLES**

Table A2-1. Criteria and Standards for PCBs in Soil.....	A-8
Table A2-2. Potential Federal Chemical-Specific ARARs by Medium.....	A-9
Table A2-3. Potential State Chemical-Specific ARARs by Medium.....	A-12
Table A3-1. Potential Federal Location-Specific ARARs .....	A-19
Table A3-2. Potential State Location-Specific ARARs .....	A-21
Table A4-1. Potential Federal Action-Specific ARARs.....	A-25
Table A4-2. Potential State Action-Specific ARARs.....	A-37

## ACRONYMS AND ABBREVIATIONS

ACL	alternative concentration limit
AM	action memorandum
APCD	Air Pollution Control District
app.	appendix
AQMD	Air Quality Management District
AR	Administrative Record
ARAR	applicable or relevant and appropriate requirement
BAT	best available technology
BCPCT	best conventional pollution control technology
CAA	Clean Air Act
Cal. Civ. Code	California Civil Code
Cal. Code Regs.	California Code of Regulations
Cal-EPA	California Environmental Protection Agency
Cal. Fish & Game Code	California Fish and Game Code
Cal. Gov't Code	California Government Code
Cal. Health & Safety Code	California Health and Safety Code
Cal. Pub. Res. Code	California Public Resources Code
Cal. Water Code	California Water Code
CAMU	corrective action management unit
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	<i>Code of Federal Regulations</i>
ch.	chapter
COPC	chemical of potential concern
CWA	Clean Water Act
CWC	California Water Code
DNAPL	dense nonaqueous-phase liquid
DON	Department of the Navy
DTSC	(Cal-EPA) Department of Toxic Substances Control
EE/CA	Engineering Evaluation/Cost Analysis
EIS	environmental impact statement
Exec. Order No.	executive order number
ESA	Endangered Species Act
FAWQC	Federal Ambient Water Quality Criteria
Fed. Reg.	<i>Federal Register</i>
FFA	Federal Facilities Agreement
FR	<i>Federal Register</i>
FS	feasibility study
gpd	gallons per day



HSWA	Hazardous and Solid Waste Amendments
HWCA	Hazardous Waste Control Act
IR	Installation Restoration (Program)
LDR	land disposal restriction
LPC	liquid-phase carbon
LUFT	leaking underground fuel tank
µg/L	micrograms per liter
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
mg/L	milligrams per liter
MILCON	military construction
MNA	monitored natural attenuation
NAAQS	National Ambient Air Quality Standards
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEPA	National Environmental Policy Act
NPDES	National Pollution Discharge Elimination System
NTR	National Toxics Rule
NWR	National Wildlife Refuge
OSWER	Office of Solid Waste and Emergency Response
OU	operable unit
PA	preliminary assessment
PCB	polychlorinated biphenyl
ppm	parts per million
ppm <sub>w</sub>	parts per million by weight
Pub. L.	Public Law
RA	remedial action
RCRA	Resource Conservation and Recovery Act
RD	remedial design
Res.	Resolution
RI	remedial investigation
ROD	Record of Decision
RTC	Response to Comments
RWQCB	(California) Regional Water Quality Control Board
SAL	state action level
SARA	Superfund Amendments and Reauthorization Act
SCAQMD	South Coast Air Quality Management District
SDAPCD	San Diego Air Pollution Control District
SDWA	Safe Drinking Water Act
SIP	State Implementation Plan
SMCL	secondary maximum contaminant level
STLC	soluble threshold limit concentration
SWAT	Solid Waste Assessment Test

SWDIV	Southwest Division Naval Facilities Engineering Command
SWRCB	(California) State Water Resource Control Board
T-BACT	best available control technology for toxics
TBC	to be considered
TCE	trichloroethene
TCLP	toxicity characteristic leaching procedure
TDS	total dissolved solids
TPH	total petroleum hydrocarbons
TSCA	Toxic Substances Control Act
TSD	treatment, storage, and disposal
TTLC	total threshold limit concentration
UIC	underground injection control
USC	<i>United States Code</i>
USDW	underground source of drinking water
U.S. EPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UST	underground storage tank
VGAC	vapor-phase granular activated carbon
VOC	volatile organic compound
WPNSTA	Naval Weapons Station
WQCP	Water Quality Control Plan
WQO	water quality objective
WSRA	Wild and Scenic Rivers Act

## Section A1: INTRODUCTION

This appendix identifies and evaluates potential federal and state of California applicable or relevant and appropriate requirements (ARARs) from the universe of regulations, requirements, and guidance and sets forth the Department of the Navy (DON) determinations regarding those potential ARARs for each response action alternative retained for detailed analysis in this EE/CA report.

This evaluation includes an initial determination of whether the potential ARARs actually qualify as ARARs, and a comparison for stringency between the federal and state regulations to identify the controlling ARARs. The identification of ARARs is an iterative process. The final determination of ARARs will be made by the DON in the record of decision (ROD) or action memorandum (AM), after public review, as part of the response action selection process.

### A1.1 Summary of CERCLA and NCP Requirements

Section 121(d) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, 42 *United States Code* [USC] Section [§] 9621[d]), as amended, states that remedial actions at CERCLA sites must attain (or the decision document must justify the waiver of) any federal or more stringent state environmental standards, requirements, criteria, or limitations determined to be legally applicable or relevant and appropriate. Although Section 121 of CERCLA does not itself expressly require that CERCLA removal actions comply with ARARs, the United States Environmental Protection Agency (U.S. EPA) has promulgated a requirement in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) mandating that CERCLA removal actions "...shall, to the extent practicable considering the exigencies of the situation, attain applicable or relevant and appropriate requirements under federal environmental or state environmental or facility siting laws" (Title 40 *Code of Federal Regulations* [CFR] §300.415[j]) (40 CFR §300.415[j]). It is DON policy to follow this requirement. Certain specified waivers may be used for removal actions, as is the case with remedial actions.

Identification of potential state ARARs was initiated through DON requests that the California Environmental Protection Agency (Cal-EPA) Department of Toxic Substances Control (DTSC) identify potential state ARARs, an action described in more detail in Section A1.2.3. Potential state ARARs that have been identified for IR Site 6 are discussed below.

### A1.2 Methodology Description

The process of identifying and evaluating potential federal and state ARARs is described in this subsection.

**A1.2.1 General.** As the lead federal agency, the DON has primary responsibility for identification of potential ARARs for IR Site 6. In preparing this ARARs analysis, the DON undertook the following measures, consistent with CERCLA and the NCP:

- Identified federal ARARs for each response action alternative addressed in the EE/CA report, taking into account site-specific information for IR Site 6;
- Reviewed potential state ARARs identified by the state to determine whether they satisfy CERCLA and NCP criteria that must be met in order to constitute state ARARs;

- Evaluated and compared federal ARARs and their state counterparts to determine which state ARARs are more stringent than the federal ARARs or are in addition to the federally required actions; and
- Reached a conclusion as to which federal and state ARARs are the most stringent and/or “controlling” ARARs for each alternative.

As outlined in Section 3.5 of this EE/CA report, the remedial action objectives for IR Site 6 are to:

- Remove areas of near-surface soil (e.g., hot spots) with PCB concentrations at and exceeding 1 mg/kg;
- Reduce concentrations of co-located pesticides and metals within the hot spot areas; and
- Return property to unrestricted use.

The remedial action alternatives retained for detailed analysis in this EE/CA are designed to accomplish these remedial action objectives. Each alternative was analyzed with respect to effectiveness, implementability, and cost. The effectiveness of an alternative refers to its ability to meet the removal action objectives. Effectiveness is evaluated by the following criteria: protection of human health and the environment, compliance with applicable or relevant and appropriate requirements (ARARs), long-term effectiveness (i.e., permanence), and short-term effectiveness (health, safety and environmental issues during the removal action). Implementability is a measure of both the technical and administrative feasibility of the chosen removal action. The implementability is evaluated by the following criteria: technical feasibility, administrative feasibility, availability of services and materials, and public acceptance. The cost of an alternative includes the cost of the removal action, as well as engineering and administrative costs.

The IR Site 6 remedial action alternatives considered for detailed analysis, and for which an ARARs analysis is presented in this appendix, are as follows:

- Alternative 1: Institutional controls;
- Alternative 2: Excavation and off-site disposal; and
- Alternative 3: No Action.

**A1.2.2 Identifying and Evaluating Federal ARARs.** The DON is responsible for identifying federal ARARs as the lead federal agency under CERCLA and the NCP. The final determination of federal ARARs will be made when the DON issues the ROD/AM. The federal government implements a number of federal environmental statutes that are the source of potential federal ARARs, either in the form of the statutes or regulations promulgated thereunder. Examples include the Resource Conservation and Recovery Act (RCRA), the Clean Water Act, the Safe Drinking Water Act, the Toxic Substances Control Act, and their implementing regulations, to name a few. See NCP preamble at 55 Fed. Reg. 8764–8765 (1990) for a more complete listing.

The proposed response action and alternatives were reviewed against all potential federal ARARs, including but not limited to those set forth at 55 Fed. Reg. 8764–8765 (1990), in order to determine if they were applicable or relevant and appropriate utilizing the CERCLA and NCP criteria and procedures for ARARs identification by lead federal agencies.

**A1.2.3 Identifying and Evaluating State ARARs.** The process of identifying and evaluating potential state ARARs by the state and the DON is described in this subsection.

**A1.2.3.1 Solicitation of State ARARS Under NCP.** U.S. EPA guidance (U.S. EPA 1988b) recommends that the lead federal agency consult with the state when identifying state ARARs for remedial actions. In essence, the CERCLA/NCP requirements at 40 CFR §300.515 for remedial actions provide that the lead federal agency request that the state identify chemical- and location-specific state ARARs upon completion of site characterization. The requirements also provide that the lead federal agency request identification of all categories of state ARARs (chemical-, location-, and action-specific) upon completion of identification of remedial alternatives for detailed analysis. The state must respond within 30 days of receipt of the lead federal agency requests. The remainder of this subsection documents the DON's efforts to date to identify and evaluate state ARARs.

The DON followed the procedures of the process set forth in 40 CFR §300.515 and Section 7.6 of the Federal Facilities Agreement (FFA) for remedial actions in seeking state assistance in identifying state ARARs.

**A1.2.3.2 Chronology of Efforts To Identify State ARARS.** The following chronology summarizes the DON efforts to obtain state assistance in identifying state ARARs for the response action at IR Site 6. Key correspondence between the DON and the state agencies relating to this effort has been included in the Administrative Record (AR) for this EE/CA.

The DON formally requested state chemical-, location-, and action-specific ARARs for IR Site 6 on 27 February 2002. Letters were sent to the DTSC and RWQCB-Colorado River Basin Region soliciting ARARs based on results of the RSE report (Battelle, 2001) and the preferred remedy of excavation and disposal of soil with PCB levels above 1 mg/kg detailed to the agencies by the DON.

Following the DON solicitation for ARARs from DTSC, DTSC provided an initial list of potential chemical and location specific ARARS and TBC state guidance, criteria, and advisories based on information in the RSE report (Battelle, 2001). DTSC stated in their reply that additional potential ARARs and TBC would be provided once the draft EE/CA was completed. In addition at this time, ARARs and TBC would be identified and DTSC would solicit ARARs from other state and local agencies.

The DON received a letter from RWQCB providing its chemical- and action-specific ARARs on 11 April 2002.

The list of potential ARARs included chemical- and action-specific ARARs that the RWQCB believes are applicable and relevant and appropriate. All the potential ARARs are listed in the tables in this appendix.

This ARAR analysis only addresses the potential state ARARs identified in the above correspondence from DTSC and RWQCB.

### **A1.3 Other General Issues**

General issues identified during the evaluation of ARARs for IR Site 6 are discussed in the following subsections.

**A1.3.1 General Approach to Requirements of the Federal Resource Conservation and Recovery Act.** The RCRA is a federal statute passed in 1976 to meet four goals: the protection of

human health and the environment, the reduction of waste, the conservation of energy and natural resources, and the elimination of the generation of hazardous waste as expeditiously as possible. The Hazardous and Solid Waste Amendments (HSWA) of 1984 significantly expanded the scope of RCRA by adding new corrective action requirements, land disposal restrictions, and technical requirements. RCRA, as amended, contains several provisions that are potential ARARs for CERCLA sites.

Substantive RCRA requirements are applicable to response actions on CERCLA sites if the waste is an RCRA hazardous waste, and either:

- The waste was initially treated, stored, or disposed after the effective date of the particular RCRA requirement; or
- The activity at the CERCLA site constitutes treatment, storage, or disposal, as defined by RCRA (U.S. EPA 1988a).

The preamble to the NCP indicates that state regulations that are components of a federally authorized or delegated state program are generally considered federal requirements and potential federal ARARs for the purposes of ARARs analysis (55 Fed. Reg. 8666, 8742 [1990]). The state of California received approval for its base RCRA hazardous waste management program on 23 July 1992 (57 Fed. Reg. 32726 [1992]). The state of California “Environmental Health Standards for the Management of Hazardous Waste,” set forth in Title 22 *California Code of Regulations*, Division 4.5 (Cal. Code Regs. Title 22, div. 4.5), were approved by U.S. EPA as a component of the federally authorized state of California RCRA program.

The regulations of Cal. Code Regs. Title 22, div. 4.5 are, therefore, a source of potential federal ARARs for CERCLA response actions. The exception is when a state regulation is “either broader in scope or more stringent” than the corresponding federal RCRA regulations. In that case, such regulations are not considered part of the federally authorized program or potential federal ARARs. Instead, they are purely state law requirements and potential state ARARs.

The U.S. EPA 23 July 1992 notice approving the state of California RCRA program (57 Fed. Reg. 32726 [1992]) specifically indicated that the state regulations addressed certain non-RCRA, state-regulated hazardous wastes that fell outside the scope of federal RCRA requirements. Cal. Code Regs. Title 22, div. 4.5 requirements would be potential state ARARs for such non-RCRA, state-regulated wastes.

A key threshold question for the ARARs analysis is whether or not the contaminants at IR Site 6 constitute federal hazardous waste as defined under RCRA and the state’s authorized program or qualify as non-RCRA, state-regulated hazardous waste. A discussion of waste characterization is included in Section A1.4.

## **A1.4 Waste Characterization**

Selection of ARARs involves the characterization of wastes as described below.

**A1.4.1 RCRA Hazardous Waste Determination.** Federal RCRA hazardous waste determination is necessary to determine whether a waste is subject to RCRA requirements at Cal. Code Regs. Title 22, div. 4.5 and other state requirements at Cal. Code Regs. Title 23, div. 3, Chapter (ch.) 15. The first step in the RCRA hazardous waste characterization process is to evaluate contaminated media at the site(s) and determine whether it constitutes a “listed” RCRA waste. The preamble to the NCP states that “...it is often necessary to know the origin of the waste to determine whether it is a listed waste and that, if such

documentation is lacking, the lead agency may assume it is not a listed waste” (55 Fed. Reg. 8666, 8758 [1990]).

This approach is confirmed in U.S. EPA guidance for CERCLA compliance with other laws (U.S. EPA 1988a), as follows:

“To determine whether a waste is a listed waste under RCRA, it is often necessary to know the source. However, at many Superfund sites, no information exists on the source of wastes. The lead agency should use available site information, manifests, storage records, and vouchers in an effort to ascertain the nature of these contaminants. When this documentation is not available, the lead agency may assume that the wastes are not listed RCRA hazardous wastes, unless further analysis or information becomes available that allows the lead agency to determine that the wastes are listed RCRA hazardous wastes.”

RCRA hazardous wastes that have been assigned U.S. EPA hazardous waste numbers (or codes) are listed in Cal. Code Regs. Title 22, §§66261.30–66261.33. The lists include hazardous waste codes beginning with the letters “F,” “K,” “P,” and “U.”

Knowledge of the exact source of a waste is required for source-specific listed wastes (“K” waste codes). Some knowledge of the nature or source of the waste is required even for listed wastes from nonspecific sources, such as spent solvents (“F” waste codes) or commercial chemical products (“P” and “U” waste codes). These listed RCRA hazardous wastes are restricted to commercially pure chemicals used in particular processes such as degreasing.

P and U wastes cover only unused and unmixed commercial chemical products, particularly spilled or off-spec products (U.S. EPA 1991a). Not every waste containing a P or U chemical is a hazardous waste. To determine whether a CERCLA investigation-derived waste contains a P or U waste, there must be direct evidence of product use. In particular, all the following criteria must be met. The chemicals must be:

- Discarded (as described in 40 CFR §261.2[a][2]),
- Either off-spec commercial products or a commercially sold grade,
- Not used (soil contaminated with spilled unused wastes is a P or U waste), and
- The sole active ingredient in a formulation.

The history of the site, including prior use, is well known for IR Site 6 and the Marine Palms housing area. However, the use or disposal of PCBs is not known or documented. The nature and distribution, as well as prior common usage of PCBs, can be used to make some inferences about the source and extent of the contamination. The PCBs are widely and randomly spread across the entire area of concern. The most likely source of these compounds is waste oil used for dust control. Surface application of waste oil was commonly done in the past to suppress windblown dust. Prior to the late 1970s, PCB-laden transformer oil could have been mixed with the waste oil prior to spreading. It is important to note that only one PCB compound, Aroclor 1254 is present at the site. This may be due to a limited time frame when dust suppressant was applied. The wastewater evaporation ponds were constructed in 1942 and abandoned in 1945. The Marine Palms housing area was constructed following destruction of the ponds in 1953 when the Base was reactivated by the Marine Corps. The application of dust suppressant likely only occurred during the construction of the housing, prior to seeding of the lawns for grass. However, there appears to be no correlation of the occurrence of the Aroclor 1254 with the footprint of the former evaporation ponds, suggesting that a source other than the ponds is responsible for these

compounds. The much higher occurrence of the PCB in the surface samples also suggests a surficial release scenario. Therefore, the DON has made the determination that the mere presence of PCBs should not classify IR Site 6 contaminated soil as RCRA-listed hazardous wastes. However, determination of how the soil will be managed after excavation will be made at the time the wastes are generated.

The second step in the RCRA hazardous waste characterization process is to evaluate potential hazardous characteristics of the waste. The evaluation of characteristic waste is described in U.S. EPA guidance as follows (U.S. EPA 1988a):

“Under certain circumstances, although no historical information exists about the waste, it may be possible to identify the waste as RCRA characteristic waste. This is important in the event that (1) remedial alternatives under consideration at the site involve on-site treatment, storage, or disposal, in which case RCRA may be triggered as discussed in this section; or (2) a remedial alternative involves off-site shipment. Because the generator (in this case, the agency or responsible party conducting the Superfund action) is responsible for determining whether the wastes exhibit any of these characteristics (defined in 40 CFR §§261.21–261.24), testing may be required. The lead agency must use best professional judgment to determine, on a site-specific basis, if testing for hazardous characteristics is necessary.

“In determining whether to test for the toxicity characteristic using the extraction procedures (EP) toxicity test, it may be possible to assume that certain low concentrations of waste are not toxic. For example, if the total waste concentration in soil is 20 times or less the EP toxicity concentration, the waste cannot be characteristic hazardous waste. In such a case, RCRA requirements would not be applicable. In other instances, where it appears that the substances may be characteristic hazardous waste (ignitable, corrosive, reactive, or EP toxic), testing should be performed.”

Hazardous waste characteristics, as defined in 40 CFR §§261.21–261.24, are commonly referred to as ignitability, corrosivity, reactivity, and toxicity. California environmental health standards for the management of hazardous waste set forth in Cal. Code Regs. Title 22, div. 4.5 were approved by U.S. EPA as a component of the federally authorized California RCRA program. Therefore, the characterization of RCRA waste is based on the state requirements.

The characteristics of ignitability, corrosivity, reactivity, and toxicity are defined in Cal. Code Regs. Title 22, §§66261.21–66261.24. According to Cal. Code Regs. Title 22, §66261.24(a)(1)(A), “A waste that exhibits the characteristic of toxicity pursuant to subsection (a)(1) of this section has the EPA Hazardous Waste Number specified in Table I of this section which corresponds to the toxic contaminant causing it to be hazardous.” Table I assigns hazardous waste codes beginning with the letter “D” to wastes that exhibit the characteristic of toxicity; D waste codes are limited to “characteristic” hazardous wastes.

According to Cal. Code Regs. Title 22, §66261.10, waste characteristics can be measured by an available standardized test method or be reasonably classified by generators of waste based on their knowledge of the waste provided that the waste has already been reliably tested or if there is documentation of chemicals used. As stated previously, decisions regarding soil management issues will be made at the time the wastes are generated.

The potential toxicity of the waste should then be evaluated. The requirements at Cal. Code Regs. Title 22, §66261.24 list the toxic contaminant concentrations that determine the characteristic of toxicity. The concentration limits are in milligrams per liter (mg/L). These units are directly comparable



to total concentrations in waste groundwater and surface water. For waste soils, these concentrations apply to the extract or leachate produced by the toxicity characteristic leachate procedure (TCLP).

A waste is considered hazardous if the contaminants in the wastewater or in the soil TCLP extract equal or exceed the TCLP limits. TCLP testing is required only if total contaminant concentrations in soil equal or exceed 20 times the TCLP limits because TCLP uses a 20-to-1 dilution for the extract (U.S. EPA 1988a).

Again, determination of how soil will be managed for disposal will be made at the time the wastes are generated.

**A1.4.2 California-Regulated, Non-RCRA Hazardous Waste.** A waste determined not to be an RCRA hazardous waste may still be considered a state-regulated non-RCRA hazardous waste. The state is broader in scope in its RCRA program in determining hazardous waste. Cal. Code Regs. Title 22, §66261.24(a)(2) lists the total threshold limit concentrations (TTLCs) and the soluble threshold limit concentrations (STLCs) for non-RCRA hazardous waste. The state applies its own leaching procedure, WET, that uses a different acid reagent and has a different dilution factor (tenfold). There are other state requirements that may be broader in scope than federal ARARs for identifying non-RCRA wastes regulated by the state. These may be potential ARARs for wastes not covered under federal ARARs. See additional subsections of Cal. Code Regs. Title 22, §66261.24. A waste is considered hazardous if its total concentrations exceed the TTLCs or if the extract concentrations from the waste extraction test (WET) exceed the STLCs. A WET is required when the total concentrations exceed the STLC but are less than the TTLCs (Cal. Code Regs. Title 22, div. 4.5, ch. 11, Appendix [app.] II [b]). Determination of how soil will be managed for disposal will be made at the time the wastes are generated.

**A1.4.3 Other California Waste Classifications.** For waste discharged after 18 July 1997, solid waste classifications at Cal. Code Regs. Title 27, §§20210, 20220, and 20230 are used to determine applicability of waste management requirements. These are summarized below.

A “designated waste” under Cal. Code Regs. Title 27, §20210 is defined at Cal. Water Code §13173. Under Cal. Water Code §13173, designated waste is hazardous waste that has been granted a variance from hazardous waste management requirements or nonhazardous waste that consists of or contains pollutants that, under ambient environmental conditions at a waste management unit, could be released in concentrations exceeding applicable water quality objectives or that could reasonably be expected to affect beneficial uses of the waters of the state.

A nonhazardous solid waste under Cal. Code Regs. Title 27, §20220 is all putrescible and nonputrescible solid, semisolid, and liquid wastes, including garbage, trash, refuse, paper, rubbish, ashes, industrial wastes, demolition and construction wastes, abandoned vehicles and parts thereof, discarded home and industrial appliances, manure, vegetable or animal solid and semisolid wastes, and other discarded waste (whether of solid or semisolid consistency), provided that such wastes do not contain wastes that must be managed as hazardous wastes or wastes that contain soluble pollutants in concentrations that exceed applicable water quality objectives or could cause degradation of waters of the state.

Under Cal. Code Regs. Title 27, §20230, inert waste is that subset of solid waste that does not contain hazardous waste or soluble pollutants at concentrations in excess of applicable water quality objectives and does not contain significant quantities of decomposable waste. These state requirements may be more stringent than hazardous waste requirements and proper waste classification will help determine their applicability.

## Section A2: CHEMICAL-SPECIFIC ARARS

Chemical-specific ARARs are generally health- or risk-based numerical values or methodologies applied to site-specific conditions that result in the establishment of a cleanup level. Many potential ARARs associated with particular response alternatives (such as closure or discharge) can be characterized as action-specific but include numerical values or methodologies to establish them so they fit in both categories (chemical- and action-specific). To simplify the comparison of numerical values, several criteria and standards for chemicals of concern are presented in Table A2-1.

**Table A2-1. Criteria and Standards for PCBs in Soil**  
(units reported in mg/kg)

Analyte	Citation			Controlling ARAR Contaminant Level
	40 CFR 761.61	40 CFR 761.120	RWQCB Designated Waste	
PCB	1	50	5	1

This section presents ARARs determination conclusions addressing numerical values for soil and air and a summary of the ARARs conclusions and a more detailed discussion of the ARARs for soil and air.

Potential federal and state chemical-specific ARARs are summarized in Tables A2-2 and A2-3, respectively.

### A2.1 Summary of ARARS Conclusions by Medium

Soil and air are the environmental media potentially affected by the IR Site 6 response actions. The conclusions for ARARs pertaining to these media are presented in the following sections.

**A2.1.1 Soil ARARs Conclusions.** Based on results presented in the RSE Report (Battelle, 2001), PCBs are present in near-surface soils. There are no promulgated chemical-specific standards for PCBs in soils that are applicable at IR Site 6. However, a PCB cleanup standard for high occupancy areas of 1 mg/kg has been established for sites managed under the Toxic Substances Control Act (15 USC §§2601–2692), 40 CFR. 761.61. This cleanup standard has been identified by the Navy as potentially relevant and appropriate for the cleanup objective at IR Site 6. Other federal and state potential chemical-specific ARARs affecting the removal objectives at IR Site 6 are associated with classification and disposal of soil generated while attaining removal action objectives.

Management of soil generated from the removal action will depend on the waste classification determined for the soil. The soil would be disposed of at a Resource Conservation and Recovery Act (RCRA)-hazardous waste facility, a California-hazardous waste facility, and/or a Class III landfill as appropriate based on classification of the generated wastes. Table 4-2 in the main body of this report provides waste classification values including total threshold limit concentration [TTLCL], soluble threshold limit concentration [STLCL], toxicity characteristic leaching procedure [TCLP], RCRA soil treatment standard, and RWQCB designated waste concentration for each compound.

**Table A2-2. Potential Federal Chemical-Specific<sup>(a)</sup> ARARs by Medium**

<b>Requirement</b>	<b>Prerequisite</b>	<b>Citation<sup>(b)</sup></b>	<b>ARAR Determination</b>	<b>Comments</b>
<b>SOIL</b>				
<b>Resource Conservation and Recovery Act (42 USC, ch. 82, §§6901–6991[i])<sup>(c)</sup></b>				
Definition of RCRA hazardous waste.	Waste.	Cal. Code Regs. Title 22, §§6261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100	Applicable	Applicable for determining whether waste is hazardous.
A solid waste is characterized as toxic, based on the TCLP, if the waste exceeds the TCLP maximum concentrations.	Waste.	40 CFR pt. 261.24(a)  Cal. Code Regs. Title 22, §66261.24(a)(1)(B)	Applicable	Applicable for determining whether waste is hazardous.
LDRs prohibit disposal of hazardous waste unless treatment standards are met.	Hazardous waste land disposal.	Cal. Code Regs. Title 22, §66268.1(f)	Applicable	Hazardous waste may be generated during removal action. Determination of hazardous waste status will be made at the time the wastes are generated.
Treatment standards including technology requirements before hazardous waste can be disposed to land.	Hazardous waste land disposal.	Cal. Code Regs. Title 22, §66268.40	Applicable	Hazardous waste may be generated during removal action. Determination of hazardous waste status will be made at the time the wastes are generated.

**Table A2-2. Potential Federal Chemical-Specific<sup>(a)</sup> ARARs by Medium (page 2 of 3)**

<b>Requirement</b>	<b>Prerequisite</b>	<b>Citation<sup>(b)</sup></b>	<b>ARAR Determination</b>	<b>Comments</b>
<b>Toxic Substances Control Act (15 USC, ch. 53, §§2601–2692)<sup>(c)</sup></b>				
Regulates storage and disposal of PCBs.	Soils, debris, sludge, or dredged materials contaminated with PCBs at concentrations greater than 50 ppm.	40 CFR §761.61(a)(4)	Relevant and appropriate	Not applicable ARAR because PCB contamination at IR Site 6 does not exceed 50 ppm and release occurred circa 1970's from use of waste oil for dust suppression.
Additional cleanup may be required to prevent unreasonable risk to human health and the environment	Spills at sites warranting additional cleanup due to human-health risk, shallow groundwater, or other factors.	40 CFR §761.120(b)	Relevant and appropriate	See previous comment
Soil within the spill area, plus a 1-foot buffer, should be excavated, and the ground restored to its original configuration by backfilling with clean soil (containing less than 1 ppm PCBs).	Low-concentration spill that involves less than 1 pound PCBs by weight.	40 CFR 761.125(b)(1)	Relevant and appropriate	See previous comment
High occupancy sites may use 1 ppm PCBs in soils as a cleanup goal.	Binding only for U.S. EPA-led sites.	40 CFR 761.61	Relevant and appropriate	See previous comment

(table continues)

Table A2-2. Potential Federal Chemical-Specific<sup>(a)</sup> ARARs by Medium (page 3 of 3)

Requirement	Prerequisite	Citation <sup>(b)</sup>	ARAR Determination	Comments
<i>AIR</i>				
<b>Clean Air Act (42 USC, ch. 85, §§7401–7671)<sup>(c)</sup></b>				
NAAQS: Primary and secondary standards for ambient air quality to protect public health and welfare (including standards for particulate matter and lead).	Contamination of air affecting public health and welfare.	40 CFR § 50.4–50.12	TBC	Not enforceable and therefore not an ARAR.

(a) Many potential action-specific ARARs contain chemical-specific limitations and are addressed in the action-specific ARAR tables  
(b) Only the substantive provisions of the requirements cited in this table are potential ARARs

(c) Statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the DON accepts the entire statutes or policies as potential ARARs; specific potential ARARs are addressed in the table below each general heading; only pertinent substantive requirements of the specific citations are considered potential ARARs

ARAR – applicable or relevant and appropriate requirement

Cal. Code Regs. – *California Code of Regulations*

CFR – *Code of Federal Regulations*

DON – Department of the Navy

LDR – land disposal restriction

NAAQS – National Ambient Air Quality Standards (primary and secondary)

PCB – polychlorinated biphenyl

ppm – parts per million

pt. – part

RCRA – Resource Conservation and Recovery Act

§– section

subpt. – subpart

TBC – to be considered

TCLP – toxicity characteristic leaching procedure

Title – title

USC – *United States Code*

U.S. EPA – United States Environmental Protection Agency

**Table A2-3. Potential State Chemical-Specific<sup>(a)</sup> ARARs by Medium**

<b>Requirement</b>	<b>Prerequisite</b>	<b>Citation<sup>(b)</sup></b>	<b>ARAR Determination</b>	<b>Comments</b>
<b><i>GROUNDWATER, SURFACE WATER, SOIL, SEDIMENTS, AND AIR</i></b>				
<b>Cal-EPA Department of Toxic Substances Control<sup>(c)</sup></b>				
Definition of “non-RCRA hazardous waste.”	Waste.	Cal. Code Regs. Title 22, §66261.22(a)(3) and (4), §66261.24(a)(2)–(a)(8), §66261.101, §66261.3(a)(2)(C) or §66261.3(a)(2)(F)	Applicable	Applicable for determining whether a waste is a non-RCRA hazardous waste.
RCRA hazardous waste treatment, storage, or disposal facilities shall comply and ensure that hazardous constituents entering the groundwater, surface water, and soil from a regulated unit do not exceed the concentration limit for contaminants of concern in the uppermost aquifer underlying the waste management area beyond the point of compliance.	Hazardous waste treatment, storage, or disposal; uppermost aquifer underlying a waste management unit beyond the point of compliance.	Title 22 CCR 66264.94(e)(1)	Relevant and Appropriate	

(table continues)

**Table A2-3. Potential State Chemical-Specific<sup>(a)</sup> ARARs by Medium (page 2 of 3)**

<b>Requirement</b>	<b>Prerequisite</b>	<b>Citation<sup>(b)</sup></b>	<b>ARAR Determination</b>	<b>Comments</b>
<b>State and Regional Water Quality Control Boards<sup>(c)</sup></b>				
Authorizes the SWRCB and RWQCB to establish in water quality control plans beneficial uses and narrative and standards to protect both surface water and groundwater quality. Authorizes regional water boards to issue permits for discharges to land or surface or groundwater that could affect water quality, including NPDES permits, and to take enforcement action to protect water quality.	Existence of surface or groundwater	Cal. Water Code, div. 7, §§13241, 13243, 13263(a), 13269, and 13360 (Porter-Cologne Water Quality Control Act)	Not an ARAR	Not applicable unless groundwater will be addressed as part of the removal action.
Describes the water basins in the Colorado River Basin Region, establishes beneficial uses of groundwater and surface water, establishes WQOs, including narrative and numerical standards, establishes implementation plans to meet WQOs and protect beneficial uses, and incorporates statewide water quality control plans and policies.	Existence of surface or groundwater	Cal. Water Code, div. 7, §13304  Comprehensive Water Quality Control Plan for the Colorado River Basin Region (Basin Plan) (Cal. Water Code §13240)	Not an ARAR  Not an ARAR	Not applicable unless groundwater will be addressed as part of the removal action.  Not applicable unless groundwater will be addressed as part of the removal action.

(table continues)

**Table A2-3. Potential State Chemical-Specific<sup>(a)</sup> ARARs by Medium (page 3 of 3)**

<b>Requirement</b>	<b>Prerequisite</b>	<b>Citation<sup>b</sup></b>	<b>ARAR Determination</b>	<b>Comments</b>
Incorporated into all regional board basin plans. Designates all groundwater and surface waters of the state as drinking water except where the TDS is greater than 3,000 ppm, the well yield is less than 200 gpd from a single well, the water is a geothermal resource or in a water conveyance facility, or the water cannot reasonably be treated for domestic use using either best management practices or best economically achievable treatment practices. Definitions of designated waste, nonhazardous waste, and inert waste.	Existence of surface or groundwater.	SWRCB Res. 88-63 (Sources of Drinking Water Policy)	Not an ARAR	Not applicable unless groundwater will be addressed as part of the removal action.
		Cal. Code Regs. Title 27, §§20210, 20220, and 20230	Applicable	Potential ARARs for classifying waste and determining ARAR status of other requirements.

(a) many potential action-specific ARARs contain chemical-specific limitations and are addressed in the action-specific ARAR tables

(b) only the substantive provisions of the requirements cited in this table are potential ARARs

(c) statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the DON accepts the entire statutes or policies as potential ARARs; specific potential ARARs are addressed in the table below each general heading; only pertinent substantive requirements of specific citations are considered potential ARARs

ARAR – applicable or relevant and appropriate requirement

Cal. Code Regs. – *California Code of Regulations*

Cal. Water Code – California Water Code

gpd – gallons per day

NPDES – National Pollutant Discharge Elimination System

ppm – parts per million

RCRA – Resource Conservation and Recovery Act

Res. – Resolution

RWQCB – (California) Regional Water Quality Control Board

§–section

SWRCB – (California) State Water Resources Control Board

TDS – total dissolved solids

Title – title

WQO – water quality objective



**A2.1.2 Air ARARs Conclusions.** Excavation and off-site disposal of soil containing PCBs is one treatment technology being considered for IR Site 6. Fugitive dust can be generated from grading and earth-moving activities. Fugitive dust emission control will be applicable. The use of dust control measures and work practices would prevent the unplanned exposure of any persons to hazardous substances. Trucks hauling excavated soil to off-site disposal locations would be covered to prevent any spread of dust. MDAQMD Rules 401 and 403 are potential ARARs for this particular remedial alternative being considered under this action. More specific information on these requirements is provided in the discussion of action-specific ARARs.

## **A2.2 Detailed Discussion of ARARs by Medium**

The following subsections provide a detailed discussion of federal and state ARARs by medium.

**A2.2.1 Soil ARARs.** The key threshold question for soil ARARs is whether or not the wastes located at IR Site 6 would be classified as hazardous waste. The soil may be classified as a federal hazardous waste as defined by RCRA and the state-authorized program, or as non-RCRA, state-regulated hazardous waste. If the soil is determined to be hazardous waste, the appropriate requirements will apply.

### **A2.2.1.1 Federal**

**RCRA Hazardous Waste and Groundwater Protection Standards.** The federal RCRA requirements at 40 CFR pt. 261 do not apply in California because the state RCRA program is authorized. The authorized state RCRA requirements are therefore considered potential federal ARARs (see Section A1.3.1). The applicability of RCRA requirements depends on whether the waste is an RCRA hazardous waste, whether the waste was initially treated, stored, or disposed after the effective date of the particular RCRA requirement, and whether the activity at the site constitutes treatment, storage, or disposal as defined by RCRA. However, RCRA requirements may be relevant and appropriate even if they are not applicable. Examples include activities that are similar to the definition of RCRA treatment, storage, or disposal for waste that is similar to RCRA hazardous waste.

The determination of whether a waste is an RCRA hazardous waste can be made by comparing the site waste to the definition of RCRA hazardous waste. The RCRA requirements at Cal. Code Regs. Title 22, §66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100 are potential ARARs because they define RCRA hazardous waste. A waste can meet the definition of hazardous waste if it has the toxicity characteristic of hazardous waste. This determination is made by using the toxicity characteristic leaching procedure (TCLP). The maximum concentrations allowable for the TCLP listed in §66261.24(a)(1)(B) are potential federal ARARs for determining whether the site has hazardous waste. If the site waste has concentrations exceeding these values, it is determined to be a characteristic RCRA hazardous waste (see Section A1.4.1).

The requirements at Cal. Code Regs. Title 22, §66264.94(a)(1), (a)(3), (c), (d), and (e) are potential federal ARARs for the vadose zone (i.e., the unsaturated zone contamination). These sections set concentration limits for the unsaturated zone as well as for groundwater and surface water. These requirements are considered to be potential federal ARARs because they are part of the approved state RCRA program.

RCRA land disposal restrictions (LDRs) at Cal. Code Regs. Title 22, §66268.1(f) are potential federal ARARs for discharging waste to land. This section prohibits the disposal of hazardous waste to land unless (1) it is treated in accordance with the treatment standards of Cal. Code Regs. Title 22, §66268.40 and the underlying hazardous constituents meet the Universal Treatment Standards at Cal.

Code Regs. Title 22, §66268.48; (2) it is treated to meet the alternative soil treatment standards of Cal. Code Regs. Title 22, §66268.49; or a treatability variance is obtained under Cal. Code Regs. Title 22, §66268.44. These are potentially applicable federal ARARs because they are part of the state-approved RCRA program. RCRA Treatment Standards for non-RCRA, state-regulated waste are not potentially applicable federal ARARs but they may be relevant and appropriate state ARARs.

**Toxic Substances Control Act.** The Toxic Substances Control Act (TSCA) regulates the storage and disposal of PCBs. U.S. EPA designed self-implementing procedures for a general, moderate-size site where there should be low residual environmental impact from remedial activities. The requirements at 40 CFR §761.61(a) are not binding for CERCLA response actions (40 CFR §761.61[a][1][ii]), and are therefore not applicable ARARs. However, the substantive cleanup levels at 40 CFR §761.61(a)(4) may be relevant and appropriate for soil response actions. Under 40 CFR §761.61(a)(4)(i)(A), the cleanup level for bulk PCB remediation waste in high-occupancy areas is less than or equal to 1 ppm without further conditions. The cleanup level for bulk PCB remediation waste in low-occupancy areas is less than or equal to 25 ppm under 40 CFR §761.61(a)(4)(i)(B)(1). These self-implementing cleanup levels cannot be used for the following: surface or ground waters, sediments in marine and freshwater ecosystems, sewers or sewage treatment systems, any private or public drinking-water sources or distribution systems, grazing lands, or vegetable gardens.

#### ***A2.2.1.2 State***

**RCRA Requirements.** State RCRA requirements included within the U.S. EPA-authorized RCRA program for California are considered to be potential federal ARARs and are discussed above. When state regulations are either broader in scope or more stringent than their federal counterparts, they are considered potential state ARARs. State requirements such as the non-RCRA, state-regulated hazardous waste requirements may be potential state ARARs because they are not within the scope of the federal ARARs (57 Fed. Reg. 60848). The Cal. Code Regs. Title 22, div. 4.5 requirements that are part of the state-approved RCRA program would be potential state ARARs for non-RCRA, state-regulated hazardous wastes.

The site waste characteristics need to be compared to the definition of non-RCRA, state-regulated hazardous waste. The non-RCRA, state-regulated waste definition requirements at Cal. Code Regs. Title 22, §66261.24(a)(2) are potential state ARARs for determining whether other RCRA requirements are potential state ARARs. This section lists the total threshold limit concentrations (TTLCs) and soluble threshold limit concentration (STLCs). The site waste may be compared to these thresholds to determine whether it meets the characteristics for a non-RCRA, state-regulated hazardous waste.

Cal. Code Regs. Title 22, §§66264.94 (e)(l), 66261.2, 66261.3 and 66261.24(a)(2)(B), which pertain to hazardous waste concentrations, listings, and identification, have been identified by the state as being potential relevant and appropriate or applicable to the soil at IR Site 6.

**Cal. Code Regs. Title 27, div. 2, subdiv. 1.** Former Cal. Code Regs. Title 23, div. 3, ch. 15 requirements that have been repealed and went into effect on 18 July 1997, the following sections define waste characteristics for discharge of waste to land. These requirements may be applicable for soil left in place that was discharged after the effective date of the requirements. They are not potentially applicable to discharges before that date but may be relevant and appropriate.

Cal. Code Regs. Title 27, §20230(a) defines inert waste as waste “that does not contain hazardous waste or soluble pollutants at concentrations in excess of applicable water quality objectives, and does not contain significant quantities of decomposable waste.” Cal. Code Regs. Title 27, §20230(b) states that “inert wastes do not need to be discharged at classified waste management units.” Cal. Code

Regs. Title 27, §20230(a) and (b) may be potential state ARARs for soil that meets the definition of inert waste.

Cal. Code Regs. Title 27, §§20210 and 20220 are state definitions for designated waste and nonhazardous waste, respectively. These may be ARARs for soil that meets the definitions. These soil classifications determine state classification and siting requirements for discharging waste to land.

Other potential ARARs identified by the RWQCB for IR Site 6 include Cal. Water Code Div. 7, §§13241, 13243, 13263(a), and 13360 (Porter-Cologne Water Quality Control Act); Water Code 13240, and State Water Resources Control Board Resolution No. 88-63. None of these ARARs identified by the RWQCB have been determined to be a potential ARAR for IR Site 6 because groundwater is not be addressed as part of the removal action.

**A2.2.2 Air ARARs.** For this EE/CA, PCBs in soil are the concern. Excavation of soil containing PCBs is one of the treatment technologies being considered; therefore, there is the potential for PCBs to be released into the air as fugitive dusts, or particulate matter, during excavation activities. So the requirements controlling this type of release are not addressed in this ARARs evaluation, but are discussed in greater detail under action-specific requirements.

## Section A3: LOCATION-SPECIFIC ARARS

Potential location-specific ARARs are identified and discussed in this section. The discussions are presented based on various attributes of the site location, such as whether it is within a floodplain. Additional surveys will be performed in connection with the response action design and response action to confirm location-specific ARARs where inadequate siting information currently exists, or in the event of changes to planned facility locations.

### A3.1 Summary of Location-Specific ARARS

IR Site 6 has no natural habitat and the species occurring there are limited to those commonly associated with human development occurring throughout the Mainside area. There are no threatened or endangered species present on IR Site 6 based on results of the ecological risk evaluation provided in the RSE (Battelle, 2001). Floodplain management and geologic characteristics are the resource categories relating to location-specific requirements potentially affected by the IR Site 6 response actions. The conclusions for ARARs pertaining to these resources are presented in the following sections.

**A3.1.1 Floodplain Management Conclusions.** The State has identified this resource category has a potential location-specific ARAR. The Hazardous Waste Control Act (HWCA) covers hazardous waste treatment, storage, or disposal (TSD) facilities constructed within a 100-year floodplain (Cal. Code Regs. Title 22, §66264.18[b]). This regulation seeks to assure that the design, construction, operation, and maintenance of TSD facilities within the 100-year floodplain will prevent washouts and subsequent releases of hazardous materials. These standards are potentially applicable federal ARARs for the construction of any new facilities used as part of this remedial action.

The requirements of actions taken within a floodplain at 40 CFR §§6(b) and 6.302 and §6 app. A address the potential impacts on floodplain beneficial use (flood control, water quality, and habitat) that could be affected by site remediation. The regulation stipulates the need for mitigation of any effects on the natural attributes of the floodplain. These requirements would be potentially applicable federal ARARs for the removal action at IR Site 6.

**A3.1.2 Geologic Characteristics Conclusions.** Table A3-1 lists federal requirements for the protection of hazardous waste facilities located in a geological sensitive area. The State identified Cal. Code Regs. Title 22, §66264.18(a) and (c) as potential ARARs. Cal. Code Regs. Title 22, §66264.18(a) prohibits the placement of TSD facilities within 60 meters (200 feet) of a fault displaced during the Holocene epoch. There will be no facilities constructed as part of this remedial action. Therefore, Cal. Code Regs. Title 22, §66264.18(a) is not a potential ARAR. Cal. Code Regs. Title 22, §66264.18(c) prohibits the placement of noncontainerized or bulk liquid hazardous waste in an area with salt domes, mines, or caves. Wastes generated during the removal activity will be containerized and only stored on-site for short periods of time. Therefore, Cal. Code Regs. Title 22, §66264.18(d) is not a potential ARAR.

### A3.2 Detailed Discussion of ARARS

The following subsections provide a detailed discussion of federal and state ARARs by location-specific resources. Pertinent and substantive provisions of the potential ARARs listed and described below were reviewed to determine whether they are potential federal or state ARARs for the soil containing PCBs at IR Site 6.

Requirements that are determined to be ARARs or TBCs are identified in Table A3-1 (federal) and Table A3-2 (state). ARARs determinations are presented in the column denoted by the heading

**Table A3-1. Potential Federal Location-Specific ARARs**

<b>Location</b>	<b>Requirement</b>	<b>Prerequisite</b>	<b>Citation<sup>(a)</sup></b>	<b>ARAR Determination</b>	<b>Comments</b>
<b>Exec. Order No. 11990, Protection of Wetlands<sup>(b)</sup></b>					
Wetland	Action to minimize the destruction, loss, or degradation of wetlands.	Wetland meeting definition of Section 7.	40 CFR §6.302(a)	TBC	Not applicable because the wildlife viewing area (which is comprised of wetlands) is comprised of stormwater retention ponds implemented as part of the Best Management Practices (BMP) for the control of industrial stormwater under the Clean Water Act.
<b>Endangered Species Act of 1973 (16 USC §§1531–1543)<sup>(b)</sup></b>					
Habitat upon which endangered species or threatened species depend	Federal agencies may not jeopardize the continued existence of any listed species or cause the destruction or adverse modification of critical habitat. The Endangered Species Committee may grant an exemption for agency action if reasonable mitigation and enhancement measures such as propagation, transplantation, and habitat acquisition and improvement are implemented.	Determination of effect upon endangered or threatened species or its habitat. Critical habitat upon which endangered species or threatened species depend.	16 USC §1536(a), (h)(1)(B)	TBC	Not applicable because IR Site 6 is located within a residential housing area for the Base, and thus the wildlife receptors at the site are limited. There are no sensitive species known to occur at IR Site 6 (Battelle, 2001).

(table continues)

**Table A3-1. Potential Federal Location-Specific ARARs (Continued)**

<b>Location</b>	<b>Requirement</b>	<b>Prerequisite</b>	<b>Citation<sup>(a)</sup></b>	<b>ARAR Determination</b>	<b>Comments</b>
<b>Resource Conservation and Recovery Act (33 USC §§6901–6991 [ii])<sup>(b)</sup></b>					
Within 61 meters (200 feet) of a fault displaced in Holocene time	New treatment, storage, or disposal of hazardous waste prohibited.	RCRA hazardous waste; treatment, storage, or disposal of hazardous waste.	Cal. Code Regs. Title 22, §66264.18(a)	Relevant and appropriate	IR Site 6 is located approximately 1,000 ft from the nearest Holocene fault (Mesquite Lake fault).
Within salt dome formation, underground mine, or cave	Placement of noncontainerized or bulk liquid hazardous waste prohibited.	RCRA hazardous waste; placement.	Cal. Code Regs. Title 22, §66264.18(c)	Relevant and appropriate	Although relevant and appropriate, no discharge is proposed to a salt dome formation, salt bed formation, or underground mines or caves.

(a) Only the substantive provisions of the requirements cited in this table are potential ARARs.

(b) Statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the DON accepts the entire statutes or policies as potential ARARs; specific potential ARARs are addressed in the table below each general heading; only substantive requirements of the specific citations are considered potential ARARs.

ARAR – applicable or relevant and appropriate requirement

Cal. Code Regs. – *California Code of Regulations*

CFR – *Code of Federal Regulations*

Exec. Order No. – executive order number

RCRA – Resource Conservation and Recovery Act

§– section

TBC – To be considered

U.S. – United States

USC – *United States Code*

**Table A3-2. Potential State Location-Specific ARARs**

<b>Location</b>	<b>Requirement</b>	<b>Prerequisite</b>	<b>Citation<sup>a</sup></b>	<b>ARAR Determination</b>	<b>Comments</b>
<b>Cal-EPA Department of Toxic Substances Control</b>					
Within 61 meters (200 feet) of a fault displaced in Holocene time.	New treatment, storage, or disposal of hazardous waste prohibited.	Hazardous waste; storage, treatment or disposal of hazardous waste.	Cal. Code Regs. tit. 22, § 66264.18(a)	Relevant and appropriate.	Although relevant and appropriate, the nearest fault (Mesquite Lake Fault) is located approximately 1,000 ft from MCAGCC.
Within 100 year floodplain.	Facility must be designed, constructed, operated, and maintained to avoid washout.	Hazardous waste; storage, treatment or disposal of hazardous waste.	Cal. Code Regs. tit. 22, § 66264.18(b)	Relevant and appropriate.	Soil generated during excavation activities will not be stored on-site for long periods of time.
Within salt dome formation, underground mines and caves.	Placement of noncontainerized or bulk liquid hazardous waste prohibited.	Hazardous waste and placement.	Cal. Code Regs. tit. 22, § 66264.18(c)	Relevant and appropriate.	Although relevant and appropriate, no discharge is proposed to a salt dome formation, salt bed formation, or underground mines or caves.

(a) Only the substantive provisions of the requirements cited in this table are potential ARARs.

ARAR – applicable or relevant and appropriate requirement.

Cal. Code Regs. – *California Code of Regulations*.

§ – section.

ARAR Determination. Determinations of status for location-specific ARARs were generally based on consultation of maps or lists included in the regulation or prepared by the administering agency. References to the document or agency consulted are provided in the Comments column and may be provided in footnotes to the table. Specific issues concerning some of the requirements are discussed in the following sections.

### **A3.2.1 Floodplains Management ARARs**

#### ***A3.2.1.1 Federal***

**Floodplain Management, Exec. Order No. 11988.** Under 40 CFR §6.302(b), federal agencies are required to evaluate the potential effects of action they may take in a floodplain to avoid, to the extent possible, adverse effects associated with direct and indirect development of a floodplain. The length of time for removal actions and storage of wastes is very limited. Therefore, 40 CFR §6.302(b) is not a potential ARAR for this response action.

**Resource Conservation and Recovery Act (33 USC §§6901–6991[i]).** Under Cal. Code Regs. Title 22, §66264.18(b), any hazardous waste facility located in a 100-year floodplain or within the maximum high tide must be designed, constructed, operated, and maintained to prevent washout of any hazardous waste by a 100-year flood or maximum high tide, unless the owner or operator can demonstrate that procedures are in effect that will cause the waste to be removed safely, before flood or tidewater can reach the facility.

#### ***A3.2.1.2 State***

The state RCRA requirements for floodplains are evaluated above as potential federal ARARs.

**A3.2.2 Geologic Characteristics ARARs.** Location-specific potential ARARs based on geological characteristics have been identified for IR Site 6. Geological characteristics of concern include the presence of Holocene faults, salt dome formations, underground mines, or caves. MCAGCC Mainside installation is bounded by two major faults. The Mesquite Lake fault is located approximately 1,000 ft to the southwest of the facility, and the West Bullion Mountain fault is located along the northeastern edge of the area. These northwest-trending geologic features are subregional in extent, and the West Bullion Mountain fault defines the eastern limit of the regional (i.e., Morongo) groundwater basin. The State has identified Cal. Code Reg 22 §§66264.18(a) and (c) as being relevant and appropriate for this site. In addition, RCRA (33 USC §§6901–6991[i]), hazardous waste facility siting criteria, Cal. Code Regs. Title 22, §§66264.18(a) and (c) is also evaluated as a potential ARAR.

#### ***A3.2.2.1 Federal***

**Resource Conservation and Recovery Act (33 USC §§6901–6991[i]).** Hazardous waste facilities must be sited in accordance with the following requirements:

Seismic considerations (Cal. Code Regs. Title 22, §66264.18(a) – portions of new facilities or facilities undergoing substantial modification where transfer, treatment, storage or disposal of hazardous waste will be conducted shall not be located within 61 meters (200 feet) of a fault which has had displacement in Holocene time.



Salt dome formations, salt bed formations, underground mines and caves (Cal. Code Regs. Title 22, §66264.18[c]) – the placement of any noncontainerized or bulk liquid hazardous waste in any salt dome formation, salt bed formation, or underground mine or cave is prohibited.

The Mesquite Lake fault is located about 1,000 ft from MCAGCC. Because IR Site 6 is not located within 61 meters of a Holocene fault and no discharge is proposed to a salt dome formation, salt bed formation, or underground mines or caves, the requirements at Cal. Code Regs. Title 22, §66264.18(a) and §66264.18(c) are not potential ARARs for this response action.

#### ***A3.2.2.2 State***

The state location-specific RCRA requirements for geologic characteristics are evaluated above as potential federal ARARs.

## Section A4: ACTION-SPECIFIC ARARS

This EE/CA report evaluates remedial action alternatives for IR Site 6 at MCAGCC. This ARARs analysis is based on three alternatives for the site. Alternative 1 is institutional controls, Alternative 2 entails excavation and off-site disposal, and Alternative 3 is no action. Detailed descriptions of the remedial alternatives are provided in the main text of this EE/CA report.

Tables A4-1 and A4-2 present and evaluate federal and state potential action-specific ARARs for IR Site 6. A discussion of the requirements determined to be pertinent to each alternative being evaluated for IR Site 6 action is presented in this section. A discussion of how the alternative complies with each identified ARAR is also provided.

### A4.1 Alternative 1 – Institutional Controls

There are no federal ARARs for land use controls. Under the California Civil Code and Health and Safety Code, however, there are provisions for land use controls, specifically for restrictions, prohibitions, variances, and agreements.

**A4.1.1 Institutional Controls.** Institutional controls are designed to restrict certain activities and/or limit access to a site, instead of eliminating the risks through active treatment. Common institutional controls include land use restrictions (e.g., zoning), regulatory controls (e.g., permitting), and access controls (e.g., fencing and signs). These controls are effective tools for promoting awareness of site risks.

State statutes that have been accepted by the DON as ARARs for implementing institutional controls and entering into an environmental restriction covenant and agreement with DTSC include substantive provisions of Cal. Civ. Code §1471 and Cal. Health & Safety Code §§25202.5, 25222.1, 25232(b)(1)(A)–(E), and 25233(c).

The substantive provisions of Cal. Civ. Code §1471 are the following general narrative standard: “...to do or refrain from doing some act on his or her own land...where...: (c) Each such act relates to the use of land and each such act is reasonably necessary to protect present or future human health or safety or the environment as a result of the presence on the land of hazardous materials, as defined in Section 25260 of the Health and Safety Code.” This narrative standard would be implemented through incorporation of restrictive environmental covenants in the deed at the time of transfer. These covenants would be recorded with the environmental restriction covenant and agreement and would run with the land.

The substantive provisions of Cal. Health & Safety Code §25202.5 are the general narrative standard to restrict “present and future uses of all or part of the land on which the...facility...is located....” These substantive provisions will be implemented by incorporation of restrictive environmental covenants in the Environmental Restriction Covenant and Agreement at the time of transfer for purposes of protecting present and future public health and safety.

Actual land-use restriction requirements are set forth in Cal. Health & Safety Code §25232(b)(1)(A)–(E). These include prohibitions on construction of residences, hospitals for humans, schools for persons under 21 years of age, day care centers, or any permanently occupied human habitation on hazardous waste property. Cal. Health & Safety Code §25233(c) sets forth substantive criteria for granting variances from the uses prohibited in Cal. Health & Safety Code §25232(b)(1)(A)–(E) based on specified environmental and health criteria.

Table A4-1. Potential Federal Action-Specific ARARs

Alternative 1: Institutional controls			ARAR Determination <sup>(a)</sup>				Comments
Alternative 2: Excavation and off-site disposal			Citation	A	RA	TBC	
Alternative 3: No action							
Action	Requirement	Prerequisites	Citation	A	RA	TBC	Comments
Resource Conservation and Recovery Act (42 USC §§6901–6991[ii])*							
On-site waste generation	Person who generates waste shall determine if that waste is a hazardous waste.	Generator of waste.	Cal. Code Regs. Title 22, §66262.10(a), 66262.11	2			Applicable for any operation where waste is generated. Determination of hazardous waste status should be documented. See below for an example.
	Requirements for analyzing waste for determining whether waste is hazardous.	Generator of waste.	Cal. Code Regs. Title 22, §66264.13(a) and (b)	2			Applicable for any operation where waste is generated. Determination of hazardous waste status should be documented. See below for an example.
Hazardous waste accumulation	On-site hazardous waste accumulation is allowed for up to 90 days as long as the waste is stored in containers or tanks, on drip pads, inside buildings, is labeled and dated, etc.	Accumulate hazardous waste.	Cal. Code Regs. Title 22, §66262.34	2			Determination of hazardous waste status will be made at the time the wastes are generated. Accumulation of hazardous wastes on site for longer than 90 days would be subject to RCRA requirements for storage facilities.
Recordkeeping	Generator must keep records	Generator of waste.	22 CCR 66262.40	2			Hazardous waste may be generated during removal action. Determination of hazardous waste status will be made at the time the wastes are generated.

**Table A4-1. Potential Federal Action-Specific ARARs (page 2 of 12)**

Alternative 1: Institutional controls						
Alternative 2: Excavation and off-site disposal						
Alternative 3: No action						
Action	Requirement	Prerequisites	Citation	ARAR Determination <sup>(a)</sup>		
				A	RA	TBC
Pretransport requirements	Hazardous waste must be packaged in accordance with DOT regulations prior to transporting.	Any operation where hazardous waste is generated.	Cal. Code Regs. Title 22, §66262.30	2		Applicable for any operation where hazardous waste is generated and transported. The determination of whether wastes generated during remedial activities are hazardous will be made at the time the wastes are generated.
	Hazardous waste must be labeled in accordance with DOT regulations prior to transporting.	Any operation where hazardous waste is generated.	Cal. Code Regs. Title 22, §66262.31	2		Applicable for any operation where hazardous waste is generated and transported. The determination of whether wastes generated during remedial activities are hazardous will be made at the time the wastes are generated.
	Provides requirements for marking hazardous waste prior to transporting.	Any operation where hazardous waste is generated.	Cal. Code Regs. Title 22, §66262.32	2		Applicable for any operation where hazardous waste is generated and transported. The determination of whether wastes generated during remedial activities are hazardous will be made at the time the wastes are generated.
	A generator must ensure that the transport vehicle is correctly placarded prior to transport of hazardous waste.	Any operation where hazardous waste is generated.	Cal. Code Regs. Title 22, §66262.33	2		Applicable for any operation where hazardous waste is generated and transported. The determination of whether wastes generated during remedial activities are hazardous will be made at the time the wastes are generated.

Table A4-1. Potential Federal Action-Specific ARARs (page 3 of 12)

Alternative 1: Institutional controls					
Alternative 2: Excavation and off-site disposal					
Alternative 3: No action					
Action	Requirement	Prerequisites	Citation	ARAR Determination <sup>(a)</sup>	
				A	RA TBC
Placement of waste in land disposal units	Movement of excavated materials to new location and placement in or on land will trigger LDRs for the excavated waste or closure requirements for the unit in which the waste is being placed.	Materials containing RCRA hazardous wastes subject to LDRs are placed in another unit.	Cal. Code Regs. Title 22, §66268.40	2	Hazardous waste may be generated during removal action. Determination of hazardous waste status will be made at the time the wastes are generated.
	Treatment of waste subject to ban on land disposal must attain levels achievable by BDA T for each hazardous constituent in each listed waste, if residual is to be land disposed.	Placement of RCRA hazardous waste in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, or underground mine or cave.	Cal. Code Regs. Title 22, §66268.42	2	Hazardous waste may be generated during removal action. Determination of hazardous waste status will be made at the time the wastes are generated.

(table continues)

**Table A4-1. Potential Federal Action-Specific ARARs (page 4 of 12)**

Alternative 1: Institutional controls Alternative 2: Excavation and off-site disposal Alternative 3: No action			ARAR Determination <sup>(a)</sup>				Comments
Action	Requirement	Prerequisites	Citation	A	RA	TBC	
Waste pile	Use a single liner and leachate collection system. Waste put into waste pile is subject to land ban regulations.	RCRA hazardous waste, noncontainerized accumulation of solid, nonflammable hazardous waste that is used for treatment or storage.	Cal. Code Regs. Title 22, §66264.251 (except 251[j], 251[e][11])	2			Determination of hazardous waste status will be made at the time the wastes are generated. Requirement may be an ARAR for soils stockpiled on-site prior to treatment or disposal.
	Allows generators to accumulate solid remediation waste in a U.S. EPA-designated pile for storage only, up to 2 years, during remedial operations without triggering LDRs.	Hazardous remediation waste temporarily stored in piles.	40 CFR §264.554	2			Stockpiles will be identified as hazardous or nonhazardous waste. If hazardous, the stockpiles will be managed in accordance with the staging pile requirements outlined in this provision.
	Prevent run-on and control and collect runoff from a 24-hour 25-year storm (waste piles, land treatment facilities, landfills). Prevent overtopping of surface impoundments.	RCRA hazardous waste treated, stored, or disposed after the effective date of the requirements.	Cal. Code Regs. Title 22, §66264.221(c), (e), (h); §66264.251(c), (d), (f), (g), (h), (k); §66264.273(c), (d), (j)(1); §66264.301(c), (d), (f), (g)		2		Not applicable because site is not a TSD facility. May be relevant and appropriate for hazardous wastes generated as part of the removal action. Storm water best management practices will be followed.

(table continues)

**Table A4-1. Potential Federal Action-Specific ARARs (page 5 of 12)**

Alternative 1: Institutional controls						
Alternative 2: Excavation and off-site disposal						
Alternative 3: No action						
Action	Requirement	Prerequisites	Citation	ARAR Determination <sup>(a)</sup>		
				A	RA	TBC
Closure of waste pile	At closure, owner shall remove or decontaminate all waste residues, contaminated containment system components, contaminated subsoils, and structures and equipment contaminated with waste and leachate, and manage them as hazardous waste. If waste is left on-site, perform postclosure care in accordance with the closure and postclosure care requirements that apply to landfills.	Waste pile used to store hazardous waste.	Cal. Code Regs. Title 22, §66264.258(a) and (b) except references to procedural requirements	2		Determination of hazardous waste status will be made at the time the wastes are generated. Substantive provisions may be ARARs for closure of hazardous waste stockpiles.
Toxic Substances Control Act (15 USC §§2601–2692)*						
Disposal of PCBs	Provides expanded decontamination procedures and disposal options for PCBs. Ensures consistency with RCRA land disposal restriction.	Remedial actions involving PCBs.	40 CFR §761.50	1, 2		Not applicable because PCB contamination at IR Site 6 does not exceed 50 ppm and release occurred circa 1970's. Rules regarding the U.S. EPA's PCB spill cleanup policies are relevant and appropriate.
	Nonliquid PCBs at concentrations of 50 ppm or greater in the form of contaminated soil, rags, or other debris shall be disposed in a TSCA-approved incinerator or in a TSCA-approved chemical waste landfill or by a TSCA-approved alternative disposal method.		40 CFR §761.60(e)	1, 2		Not applicable because PCB contamination at IR Site 6 does not exceed 50 ppm and release occurred circa 1970's. Rules regarding the U.S. EPA's PCB spill cleanup policies are relevant and appropriate.

**Table A4-1. Potential Federal Action-Specific ARARs (page 6 of 12)**

Alternative 1: Institutional controls Alternative 2: Excavation and off-site disposal Alternative 3: No action			ARAR Determination <sup>(a)</sup>			
Action	Requirement	Prerequisites	Citation	A	RA	TBC
PCB storage on-site prior to disposal	Storage facilities must be constructed with adequate roof and walls; with a floor and curb of impervious materials; without drain valves, floor drains, expansion joints, sewer lines, or other openings; and above the 100-year floodwater level.	PCB concentrations of 50 ppm or greater and PCB items with PCB concentrations of 50 ppm or greater.	40 CFR 761.65(b)		2	Not applicable because PCB contamination at IR Site 6 does not exceed 50 ppm and release occurred circa 1970's. Rules regarding the U.S. EPA's PCB spill cleanup policies are to be considered.
	Temporary storage (30 days or less) need not comply with above storage regulations for the following items: PCB articles and equipment that are nonleaking; leaking articles and equipment placed in nonleaking containers; PCB containers containing nonliquid PCBs, such as soil, rags, and debris; or liquid PCBs between 50 to 500 ppm if covered by spill prevention, control, and countermeasure plan.	Temporary storage of PCB concentrations of 50 ppm or greater and PCB items with PCB concentrations of 50 ppm or greater.	40 CFR §761.65(c), except §761.65(c)(9)		2	Not applicable because PCB contamination at IR Site 6 does not exceed 50 ppm and release occurred circa 1970's. Rules regarding the U.S. EPA's PCB spill cleanup policies are to be considered.

(table continues)



**Table A4-1. Potential Federal Action-Specific ARARs (page 7 of 12)**

Alternative 1: Institutional controls						
Alternative 2: Excavation and off-site disposal						
Alternative 3: No action						
Action	Requirement	Prerequisites	Citation	ARAR Determination <sup>(a)</sup>		
				A	RA	TBC
PCB storage on-site prior to disposal (continued)	All storage areas must be properly marked.	PCB concentrations of 50 ppm or greater and PCB items with PCB concentrations of 50 ppm or greater.	40 CFR §761.65(c)(3)		2	Not applicable because PCB contamination at IR Site 6 does not exceed 50 ppm and release occurred circa 1970's. Rules regarding the U.S. EPA's PCB spill cleanup policies are to be considered.
	No item of movable equipment used to handle PCBs that comes in contact with PCBs shall be moved from the storage area unless it has been decontaminated as specified in 40 CFR §761.79.	PCB concentrations of 50 ppm or greater and PCB items with PCB concentrations of 50 ppm or greater.	40 CFR §761.65(c)(4)		2	Not applicable because PCB contamination at IR Site 6 does not exceed 50 ppm and release occurred circa 1970's. Rules regarding the U.S. EPA's PCB spill cleanup policies are to be considered.
	All stored articles must be checked for leaks every 30 days.	PCB concentrations of 50 ppm or greater and PCB items with PCB concentrations of 50 ppm or greater.	40 CFR §761.65(c)(7)		2	Not applicable because PCB contamination at IR Site 6 does not exceed 50 ppm and release occurred circa 1970's. Rules regarding the U.S. EPA's PCB spill cleanup policies are to be considered.
	Containers must be dated when they are placed in storage.	PCB concentrations of 50 ppm or greater and PCB items with PCB concentrations of 50 ppm or greater.	40 CFR §761.65(c)(8)		2	Not applicable because PCB contamination at IR Site 6 does not exceed 50 ppm and release occurred circa 1970's. Rules regarding the U.S. EPA's PCB spill cleanup policies are to be considered.

(table continues)

**Table A4-1. Potential Federal Action-Specific ARARs (page 8 of 12)**

Alternative 1: Institutional controls Alternative 2: Excavation and off-site disposal Alternative 3: No action			ARAR Determination <sup>(a)</sup>				Comments
Action	Requirement	Prerequisites	Citation	A	RA	TBC	
Cleanup of PCB spills	Cleanup of PCBs to different levels depending upon spill location, potential exposure to residual PCBs after cleanup, concentrations originally spilled, and the nature and size of the population potentially exposed.	Spills of PCBs that occur after 04 May 1987 and result from release of materials containing PCBs at concentrations of 50 ppm or greater.	40 CFR §761.120; 761.123; 761.125 except 125(a)(1), 125(b)(3), and record-keeping requirements in 125(c) such as 125(c)(1)(iii), 125(c)(5); 761.130; 761.135		2		Not applicable because PCB contamination at IR Site 6 does not exceed 50 ppm and release occurred circa 1970's. Rules regarding the U.S. EPA's PCB spill cleanup policies are to be considered.
	Additional cleanup may be required to prevent unreasonable risk to human health and the environment.	Spills at sites warranting additional cleanup due to human-health risk, shallow groundwater, or other factors.	40 CFR §761.120(b)		2		Not applicable because PCB contamination at IR Site 6 does not exceed 50 ppm and release occurred circa 1970's. Rules regarding the U.S. EPA's PCB spill cleanup policies are to be considered.
	For low-concentration spills (less than 500 ppm PCBs), solid surfaces should be double-washed/rinsed and all soil within the spill area, plus a 1-foot buffer, should be excavated, and the ground restored to its original configuration by backfilling with clean soil (containing less than 1 ppm PCBs).	Low-concentration spill that involves less than 1 pound PCBs by weight.	40 CFR §761.125(b)(1)		2		Not applicable because PCB contamination at IR Site 6 does not exceed 50 ppm and release occurred circa 1970's. Rules regarding the U.S. EPA's PCB spill cleanup policies are to be considered.

(table continues)

Table A4-1. Potential Federal Action-Specific ARARs (page 9 of 12)

Alternative 1: Institutional controls						
Alternative 2: Excavation and off-site disposal						
Alternative 3: No action						
Action	Requirement	Prerequisites	Citation	ARAR Determination(a)		
				A	RA	TBC
Clean Air Act (42 USC §§7401–7671)*						
Discharge to air	NAAQS – primary and secondary standards for ambient air quality to protect public health and welfare (including standards for particulate matter and lead).	Contamination of air affecting public health and welfare.	40 CFR §50.4–50.12			Not an ARAR. Federal NAAQS are nonenforceable standards.
Federal Hazardous Materials Transportation Law (49 USC §§5101–5127)*						
Transportation of hazardous material	No person shall represent that a container or package is safe unless it meets the requirements of 49 USC §§5101–5127 .	Interstate carriers transporting hazardous waste and substances by motor vehicle. Transportation of hazardous material under contract with any department of the executive branch of the federal government.	49 CFR §171.2(f)	2	2	Determination of hazardous waste status will be made at the time the wastes are generated. Provisions are relevant and appropriate for on-base transport and applicable for off-site transport of hazardous waste.
	No person shall unlawfully alter or deface labels, placards or descriptions, packages, containers, or motor vehicles used for transportation of hazardous materials.		49 CFR §171.2(g)	2	2	Determination of hazardous waste status will be made at the time the wastes are generated. Provisions are relevant and appropriate for on-base transport and applicable for off-site transport of hazardous waste.

(table continues)

**Table A4-1. Potential Federal Action-Specific ARARs (page 10 of 12)**

Alternative 1: Institutional controls						
Alternative 2: Excavation and off-site disposal						
Alternative 3: No action						
Action	Requirement	Prerequisites	Citation	ARAR Determination <sup>(a)</sup>		
				A	RA	TBC
Hazardous materials marking, labeling, and placarding	Each person who offers hazardous material for transportation or each carrier that transports it shall mark each package, container, and vehicle in the manner required.	Person who offers hazardous material for transportation; carries hazardous material; or packages, labels, or placards hazardous material.	49 CFR §172.300	2	2	Determination of hazardous waste status will be made at the time the wastes are generated. Provisions are relevant and appropriate for on-base transport and applicable for off-site transport of hazardous waste.
	Hazardous materials for transportation in bulk packages must be labeled with proper ID number, specified in 49 CFR §172.101 table, with required size of print. Packages must remain marked until cleaned or refilled with material requiring other marking.		49 CFR §172.302	2	2	Determination of hazardous waste status will be made at the time the wastes are generated. Provisions are relevant and appropriate for on-base transport and applicable for off-site transport of hazardous waste.
	No package marked with a proper shipping name or ID number may be offered for transport or transported unless the package contains the identified hazardous material or its residue.		49 CFR §172.303	2	2	Determination of hazardous waste status will be made at the time the wastes are generated. Provisions are relevant and appropriate for on-base transport and applicable for off-site transport of hazardous waste.
	The markings must be durable, in English, in contrasting colors, unobscured, and away from other markings.		49 CFR §172.304	2	2	Determination of hazardous waste status will be made at the time the wastes are generated. Provisions are relevant and appropriate for on-base transport and applicable for off-site transport of hazardous waste.

**Table A4-1. Potential Federal Action-Specific ARARs (page 11 of 12)**

Alternative 1: Institutional controls			ARAR				
Alternative 2: Excavation and off-site disposal			Determination <sup>(a)</sup>				
Alternative 3: No action							
Action	Requirement	Prerequisites	Citation	A	RA	TBC	Comments
Solid waste disposal facility	A facility or practice shall not: contaminate an underground drinking water source beyond the solid waste boundary or a court- or state-established alternative; cause a discharge of pollutants into waters of the United States that is in violation of the substantive requirements of the NPDES under CWA Section 402, as amended; cause a discharge of dredged material or fill material to waters of the United States that is in violation of the substantive requirements of CWA Section 404; or cause nonpoint source pollution of waters of the United States that violates applicable legal substantive requirements implementing an areawide or statewide water quality management plan approved by the Administrator under CWA Section 208, as amended.	Solid waste disposal facility and practices except agricultural wastes, overburden resulting from mining operations, land application of domestic sewage, location and operations of septic tanks, solid or dissolved materials in irrigation return flows, industrial discharges that are point sources subject to permits under CWA, source special nuclear or by-product material as defined by the Atomic Energy Act, hazardous waste disposal facilities that are subject to regulation under RCRA subtitle C, disposal of solid waste by underground well injection, and municipal solid waste landfill units.	40 CFR §257.3–257.4 and Appendix I		2		Although this action does not involve solid waste disposal facilities, the substantive provisions of this regulation are relevant and appropriate to excavated soil that may be used on-site as replacement fill if concentrations are below thresholds that trigger shipment to an off-site landfill.

(table continues)

**Table A4-1. Potential Federal Action-Specific ARARs (page 12 of 12)**

(a) The ARAR Determination was completed by placing the alternative number in the appropriate column (A for applicable, RA for relevant and appropriate, and TBC for to be considered; Alternative 1: Institutional controls, Alternative 2: Excavation and off-site disposal, Alternative 3: No action

\* statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader. Listing the statutes and policies does not indicate that the DON accepts the entire statutes or policies as potential ARARs; specific potential ARARs are addressed in the table below each general heading; only substantive requirements of specific citations are considered potential ARARs

A – applicable

ARAR – applicable or relevant and appropriate requirement

BDAT – best demonstrated available technology

Cal. Code Regs. – *California Code of Regulations*

CFR – *Code of Federal Regulations*

CWA – Clean Water Act

DON – Department of the Navy

DOT – Department of Transportation

IR – Installation Restoration (Program)

LDR – land disposal restriction

NAAQS – National Ambient Air Quality Standards (primary and secondary)

NPDES – National Pollutant Discharge Elimination System

PCB – polychlorinated biphenyl

ppm – parts per million

RA – relevant and appropriate

RCRA – Resource Conservation and Recovery Act

§– section

TBC – to be considered

Title – title

TSCA – Toxic Substances Control Act

USC – *United States Code*

U.S. EPA – United States Environmental Protection Agency

**Table A4-2. Potential State Action-Specific ARARs**

Alternative 1: Institutional controls Alternative 2: Excavation and off-site disposal Alternative 3: No action			ARAR Determination <sup>(a)</sup>			
Action	Requirement	Prerequisites	Citation	A	RA	TBC
<b>State Water Resources Control Board and Regional Water Quality Control Board*</b>						
Waste management unit	Regulation of silting, design, construction, operation, closure, and monitoring of waste discharges to land for treatment, storage, or disposal, including landfills, surface impoundments, waste piles, and land treatment facilities. Wastes regulated include hazardous waste, designated waste, nonhazardous waste, and inert waste.	Waste management unit.	Title 27 CCR, Division 2, Chapter 3, Subchapter 2, Article 2, Section 20210; Article 3, Section 20240-20260; Subchapter 4, Article 4, Section 20870.	2		Applicable because Site 6 wastes are potential hazardous and/or designated waste. Determination of designated waste status will be made at the time the wastes are generated.
Waste piles	New waste piles shall comply with construction standards	Waste piles used to store hazardous or designated waste.	Title 27 CCR, Division 2, Chapter 3, Subchapter 2, Article 4.	2		Relevant and appropriate for removal alternatives that require temporary storage of excavated soil prior to treatment and disposal.
Waste piles	Class I and Class II waste piles shall be covered as necessary to prevent percolation of precipitation through waste.	Waste pile used to store hazardous or designated waste.	Title 27 CCR, Divisions 2, Chapter 3, Subchapter 2, Article 4, Section 20365.	2		Applicable because removal action at Site 6 potentially involves temporary storage of hazardous or designated waste in a waste pile.

(table continues)

**Table A4-2. Potential State Action-Specific ARARs (page 2 of 6)**

Alternative 1: Institutional controls Alternative 2: Excavation and off-site disposal Alternative 3: No action			ARAR Determination <sup>(a)</sup>			
Action	Requirement	Prerequisites	Citation	A	RA	TBC
Disposal of waste	Requires that designated waste as defined at Cal. Water Code §13173 be discharged to Class I or Class II waste management units.	Discharges of designated waste after 18 July 1997 (nonhazardous waste that could cause degradation of surface or ground waters) to land for treatment, storage, or disposal.	Cal. Code Regs. Title 27, §20210	2		Applicable because Site 6 wastes are potential hazardous and/or designated waste. Determination of designated waste status will be made at the time the wastes are generated.
	Requires that nonhazardous solid waste as defined at §20220(a) be discharged to a classified waste management unit.	Discharge of nonhazardous solid waste after 18 July 1997 to land for treatment, storage, or disposal.	Cal. Code Regs. Title 27, §20220(b), (c), and (d)	2		May be an ARAR for waste that meets the definition of “nonhazardous waste.” May be more stringent than federal RCRA requirements. Determination of designated waste status will be made at the time the wastes are generated.
	Inert waste as defined at §20230(a) need not be discharged at a classified unit.	Applies to discharges of inert waste to land after 18 July 1997 for treatment, storage, or disposal.	Cal. Code Regs. Title 27, §20230(b)	2		May be an ARAR for waste that meets the definition of “inert waste.” If the waste is inert, it may be disposed more easily or used as fill because it does not need to be discharged to a classified unit. Determination of designated waste status will be made at the time the wastes are generated.

(table continues)



Table A4-2. Potential State Action-Specific ARARs (page 3 of 6)

Alternative 1: Institutional controls							
Alternative 2: Excavation and off-site disposal							
Alternative 3: No action							
Action	Requirement	Prerequisites	Citation	ARAR Determination <sup>(a)</sup>			Comments
				A	RA	TBC	
Cal-EPA Department of Toxic Substances Control*							
Disposal of non-RCRA waste	Definition of non-RCRA, California-regulated hazardous waste.	Generator of waste.	22 CCR 66261.22(a)(3)-(4); 66261.24(a)(2)-(8); 66261.101; 66261.3(a)(2)(C) ; 66261.3(a)(2)(F)	2			Applicable for any operation where waste is generated. Determination of hazardous waste status will be made at the time the wastes are generated.
Disposal of non-RCRA waste	Land disposal restrictions for non-RCRA, California-regulated hazardous waste.	Non-RCRA, California-regulated hazardous waste disposal.	Cal. Code Regs. Title 22, §66268.105	2			Applicable for any operation where waste is generated. Determination of hazardous waste status will be made at the time the wastes are generated.
California Civil Code*							
Land-use controls	Provides conditions under which land-use restrictions will apply to successive owners of land.	Transfer property from the DON to a nonfederal agency.	Cal. Civ. Code §1471	1			There are currently no plans to transfer this property to a nonfederal entity. However, this code would be considered in the development of the institutional controls plan to ensure that land use restrictions are properly implemented to protect public health and safety should a property transfer occur at a later date.

(table continues)

**Table A4-2. Potential State Action-Specific ARARs (page 4 of 6)**

Alternative 1: Institutional controls						
Alternative 2: Excavation and off-site disposal						
Alternative 3: No action						
Action	Requirement	Prerequisites	Citation	ARAR Determination <sup>(a)</sup>		
				A	RA	TBC
California Health and Safety Code*						
Land-use controls	Allows DTSC to enter into an agreement with the owner of a hazardous waste facility to restrict present and future land uses.	Transfer property from the DON to a nonfederal agency.	Cal. Health & Safety Code §25202.5	1		See previous comment.
	Provides a streamlined process to be used to enter into an agreement to restrict specific use of property in order to implement the substantive use restrictions of Cal. Health & Safety Code §25232(b)(1)(A)–(E).	Transfer property from the DON to a nonfederal agency.	Cal. Health & Safety Code §25222.1	1		See previous comment.
	Prohibits certain uses of land containing hazardous waste without a specific variance.	Hazardous waste property.	Cal. Health & Safety Code §25232(b)(1)(A)–(E)	1		Land-use restrictions would be needed to prohibit: future residential use of the site, construction of hospitals, schools, or day-care centers for children, or any permanently occupied human habitation on the sites.
	Provides a process for obtaining a written variance from a land-use restriction.	Transfer property from the DON to a nonfederal agency.	Cal. Health & Safety Code §25233(c)	1		There are currently no plans to transfer this property to a non-federal entity. However, this code would be considered in the development of the institutional controls plan to ensure that land use restrictions are properly implemented to protect public health and safety should a property transfer occur at a later date.

Table A4-2. Potential State Action-Specific ARARs (page 5 of 6)

Alternative 1: Institutional controls					
Alternative 2: Excavation and off-site disposal					
Alternative 3: No action					
Action	Requirement	Prerequisites	Citation	ARAR Determination <sup>(a)</sup>	
				A	RA TBC
Waste Piles	Provision for 90-day waiver for stockpiling of state regulated, non-RCRA hazardous soil.	State-regulated, non-RCRA hazardous waste stockpiling.	Cal. Health & Safety Code §25123.3	2	Determination of hazardous waste status will be made at the time the wastes are generated. Requirement may be an ARAR for soils stockpiled on-site prior to treatment or disposal.
<b>Mojave Desert Air Quality Management District</b>					
Air emission	Visible emissions standard that states a person shall not discharge any air contaminant into the atmosphere from any single source of emission for a period or periods aggregating more than 3 minutes in a 60-minute period, which is (a) as dark or darker in shade as that designated No. 1 on the Ringelmann Chart, or (b) of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in (a).		MDAQMD Rule 401	2	Grading and excavation activities have the potential to produce visible emissions due to fugitive dust. Wetting the soil may be required to minimize fugitive dust.

**Table A4-2. Potential State Action-Specific ARARs (page 6 of 6)**

Alternative 1: Institutional controls						
Alternative 2: Excavation and off-site disposal						
Alternative 3: No action						
Action	Requirement	Prerequisites	Citation	ARAR Determination <sup>(a)</sup>		Comments
				A	RA TBC	
	Shall not cause or allow the emissions of fugitive dust such that the presence of such dust remains visible in the atmosphere beyond the property line of the emission source and shall not cause or allow PM <sub>10</sub> levels to exceed 50 micrograms per cubic meter when determined, by simultaneous sampling, as the difference between upwind and downwind samples.		MDAQMD Rule 403	2		Fugitive dust can be generated from grading and earth-moving activities. Fugitive dust emission control will be applicable.

(a) The ARAR Determination was completed by placing the alternative number in the appropriate column (A for applicable, RA for relevant and appropriate, and TBC for to be considered; Alternative 1: Institutional controls, Alternative 2: Excavation and off-site disposal, Alternative 3: No action.

\* statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the DON accepts the entire statutes or policies as potential ARARs; specific potential ARARs are addressed in the table below each general heading; only substantive requirements of the specific actions are considered potential ARARs.

A – applicable

ARAR – applicable or relevant and appropriate requirement

Cal. Code Regs. – *California Code of Regulations*

Cal-EPA – California Environmental Protection Agency

DON – Department of the Navy

DTSC – (Cal-EPA) Department of Toxic Substances Control

MDAQMD – Mojave Desert Air Quality Management District

PM<sub>10</sub> – particulate matter, less than 10 micrometers in diameter

RA – relevant and appropriate

RCRA – Resource and Recovery Act

Res. – resolution

RWQCB – Regional Water Quality Control Board Colorado River Basin

§– section

TBC – to be considered

Title – title

Cal. Health & Safety Code §25222.1 provides the authority for the state to enter into voluntary agreements to establish land-use covenants with the owner of property. The Cal. Health & Safety Code §25222.1 Land Use Covenant Agreement itself is in the form of an agreement, and this procedural form does not qualify as a legally binding “applicable or relevant and appropriate” requirement under CERCLA because it is administrative (procedural) in nature. The substantive provision of Cal. Health & Safety Code §25222.1 is the general narrative standard: “restricting specified uses of the property.” The DON will comply with the substantive requirements of Cal. Health & Safety Code §25222.1 by incorporating CERCLA use restrictions, which are also consistent with the substantive requirements of Cal. Health & Safety Code §25232(b)(1)(A)–(E) and Cal. Health & Safety Code §25233(c), into the DON’s deed of conveyance in the form of restrictive covenants under the authority of Cal. Civ. Code §1471. The substantive provisions of Cal. Health & Safety Code §25222.1 may be interpreted in a manner that is consistent with the substantive provisions of Cal. Civ. Code §1471. The covenants would be recorded with the deed and run with the land.

In addition to being implemented through the environmental restriction covenant and agreement between the DON and DTSC, the appropriate and relevant portions of Cal. Health & Safety Code §§25202.5, 25221.1, 25232, and 25233 and Cal. Civ. Code §1471 shall also be implemented through the deed between the DON and the transferee.

U.S. EPA does not agree with the DON and DTSC that the sections of the California Civil Code and Health and Safety Code cited above are ARARs. These state regulations fail to meet the criteria for ARARs pursuant to U.S. EPA guidance, i.e., they are administrative, not substantive, requirements that establish a discretionary way to implement land-use restrictions. However, while U.S. EPA does not agree that these state regulations require the DON to enter into a land-use covenant with DTSC, U.S. EPA believes that, if necessary for the protection of human health and the environment, it may be appropriate for the facility to elect to enter into an enforceable written agreement with DTSC to enforce land-use restrictions at a site.

## **A4.2 Alternative 2 – Excavation And Off-Site Disposal**

ARARs for excavation are typically state-promulgated regulations pertaining to fugitive emissions, temporary storage (of wastes for treatment or disposal) or protection of species and habitat during remedial construction activities. Federal and state ARARs were evaluated with respect to these issues. Results of the evaluation are provided below.

**A4.2.1 Federal ARARs.** If, based on the hazardous waste determination described under federal chemical-specific ARARs discussion, wastes are determined to be hazardous, substantive requirements of Cal. Code Regs. Title 22, §66262.34 (pertaining to hazardous waste accumulation) will be applicable and also may be relevant and appropriate if the waste does not meet the definition of hazardous but is similar to RCRA hazardous waste and if RCRA-type storage, treatment, or disposal is part of the response action. Alternative 2 involves the stockpiling of excavated materials while waste characterization is performed. As such, the substantive requirements of Cal. Code Regs. Title 22, §§66264.251, 66264.258(a) and (b), 66264.111, and 66264.114 (pertaining to the control of run-on and runoff and closure of waste piles) are relevant and appropriate requirements for the temporary storage of stockpiled materials. In addition, substantive requirements of 49 CFR §§171.2(f), 172.300, 172.302, 172.303, 172.304, 172.400, and 172.504 (pertaining to the Department of Transportation requirements for transport of hazardous materials) would be relevant and appropriate for transport of materials on-site.

Also, under the clean closure alternative, after contaminated soil has been excavated and stockpiled, the stockpiled material will be sampled and characterized for disposal.

The provisions of Cal. Code Regs. Title 22, §66264.250 regarding storage of wastes under structures for protection from precipitation will not be met during site excavation activities, therefore, the prescriptive requirements at §66264.251 are potential ARARs. Potential federal clean closure ARARs such as Cal. Code Regs. Title 22, §66264.111(a) and (b) are not ARARS for IR Site 6 because no land-based disposal units are planned for waste management.

**A4.2.2 State ARARs.** If the excavated soil is determined to be neither RCRA nor non-RCRA hazardous waste, a designated waste determination must be made prior to disposal in accordance with the substantive provisions of Cal. Code Regs. Title 27, §20200. Alternative 2 involves the stockpiling of excavated materials while waste characterization is performed.

Fugitive dust may be generated during the excavation and handling of the contaminated soil. The pertinent substantive provisions of the MDAQMD are considered potential ARARs for these activities. MDAQMD requires that reasonably available control measures be applied to prevent fugitive-dust emissions.

**A4.2.3 Conclusions.** The controlling potential ARARs for Alternative 2 will be associated with how the waste that is generated during excavation will be classified (i.e., hazardous or non-hazardous). The specific potential ARARs will be identified at the time the waste classification is made.

#### **A4.3 Alternative 3 – No Action**

There is no need to identify ARARs for the no-action alternative because ARARs apply to “any removal or remedial action conducted entirely on-site” and “no action” is not a removal or remedial action (CERCLA Section 121(e), 42 USC §9621[e]). CERCLA §121 (42 USC §9621) cleanup standards for selection of a Superfund remedy, including the requirement to meet ARARs, are not triggered by the no-action alternative (U.S. EPA 1991b). Therefore, a discussion of compliance with action-specific ARARs is not appropriate for this alternative.

## Section A5: SUMMARY

Controlling ARARs have been identified in the text of this appendix for PCBs in soil. The most stringent numerical limitations (the controlling numerical values) associated with federal or state ARARs for each site-related chemical are identified in the ARARs tables provided in each section. Each numerical limit identified in the tables pertains to specific activities that constitute discharge or placement into the identified medium.

The substantive provisions of the following requirements were identified as potential ARARs that affected the development of response action objectives for this action.

- PCB cleanup standard for high occupancy areas of 1 mg/kg under the Toxic Substances Control Act (15 USC §§2601–2692), 40 CFR. 761.61 is a potentially relevant and appropriate federal ARARs.
- RCRA hazardous waste classification, generation, and disposal in Cal. Code Regs. Title 22, §66262.10(a), 66262.11, Cal. Code Regs. Title 22, §66264.13(a) and (b).
- Waste piles under Cal. Code Regs. Title 22, §66264.251 (except 251[j], 251[e][11]) and 40 CFR §264.554.

The evaluation of location-specific ARARs indicates that IR Site 6 is within a floodplain, however the Soil generated during excavation activities will not be stored on-site for long periods of time.

No geologic characteristics were identified in or near the project area that would require potential ARARs for the Site. Requirements under 36 CFR §65.1(b)(1) are not potentially relevant and appropriate federal ARARs for the response action site

Actions evaluated as part of the remedial alternatives considered are soil excavation. RCRA requirements for hazardous waste treatment, storage, and disposal Cal. Code Regs. Title 22, §66262 may be applicable. Additional information on soil concentrations will be obtained during excavation, and these requirements will be included as necessary.

MDAQMD requirements to be met for potential fugitive dust emissions during excavation and off-site disposal include potentially applicable federal ARARs in Rules 401 and 403. Control of fugitive emissions is via best available control technology.

## Section A6: REFERENCES

Cal. Code Regs. *See California Code of Regulations.*

*California Code of Regulations.* See websites in this section for specific regulations.

———. 1994. Letter, Use of California Cancer Potency Factors for Marine Corps Base Camp Pendleton, to Southwest Division Naval Facilities Engineering Command. 31 March.

California Regional Water Quality Control Board. 1986. Designated Methodology Model.

———. 1989. Staff Report: The Designated Level Methodology for Waste Classification and Cleanup Level Determination: RWQCB Central Valley Region. June.

———. 1991. RWQCB San Diego, Order 91-10. Waste Discharge Requirements for Groundwater Remediation and Dewatering Waste Discharges to Surface Water Within the San Diego Region Except for San Diego Bay. January.

———. 1995\_. RWQCB SD, Resolution No. 95-96. Conditionally Waiving Adoption of Waste Discharge Requirements for Temporary Discharge of Contaminated Soils to Waste Piles (Stockpiles). November.

———. 1995\_. RWQCB San Diego, Resolution No. 95-25. Waste Discharge Requirements for Groundwater Extraction and Similar Waste Discharges to San Diego Bay and Storm Drains or Other Conveyance Systems. May.

———. 1998\_. RWQCB LA, Resolution No. 98-018. Amendment to the Water Quality Control Plan to Incorporate Changes in Beneficial Use Designations for Selected Wastes. November.

RWQCB, SWRCB Water Quality Control Plans.

California State Water Quality Control Board. 1974. Water Quality Control Plan, Santa Ana River Basin.

California State Water Resources Control Board. 1968. Resolution No. 68-16. Statement of Policy With Respect to Maintaining High Quality Waters in California.

———. 1988. Resolution No. 88-63. Sources of Drinking Water.

———. 1991?. Order No. 91-13-DWQ, as amended by Order No. 92-12-DWQ (General Industrial Storm Water Permit).

———. 1992. Resolution No. 92-49 (as amended on 21 April 1994 and 02 October 1996): Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304.

———. 1994a. Application of State Water Board Resolution No. 68-16 to Cleanup of Contaminated Groundwater. February.

———. 1994\_. Resolution No. 94-18. Approval of Revised Water Quality Control Plan for the Colorado River Basin, “Basin Plan.”

———. 1994\_. Resolution No. 94-60. Approval of Revised Water Quality Control Plan for the Santa Ana River Basin, “Basin Plan.”

———. 1994\_. Resolution No. 94-89. Approval of Revised Water Quality Control Plan for the Los Angeles Basin Region, “Basin Plan.”

———. 1994\_. Resolution No. 94-16. Approval of Revised Water Quality Control Plan for the San Diego Region, “Basin Plan.”

———. 1995\_. Resolution No. 95-61. Amendment to San Diego Basin Plan, Defines Subbasins in Laguna, Mission Viejo, and San Clemente.

———. 1995\_. Resolution No. 95-62. Amendment to San Diego Basin Plan, Specific for Groundwater in Alluvial Aquifer Located at Moosa and Valley Center.

———. 1996\_. Resolution No. 96-26. Amendment to San Diego Basin Plan, Waiver of WDRs for Subsurface Disposal Systems.

———. 1996\_. Resolution No. 96-27. Amendment to San Diego Basin Plan, Specifies Discharges Subject to WDR Waiver.



- . 1996\_\_. Resolution No. 96-86. Amendment to San Diego Basin Plan.
- . 1997a. Resolution No. 97-026. California Ocean Plan. 23 July.
- . 1997\_\_. Resolution No. 97-066. Amendment to Santa Ana River Basin Plan, Revised Bacterial Standards for Ocean Water.
- . 1997\_\_. Resolution No. 97-084. Amendment to San Diego Basin Plan.
- . 1998\_\_. Resolution No. 98-037/117. Amendment to Santa Ana River Basin Plan, Establishes TMDL Standards for Newport Bay/San Diego Creek Watershed.
- . 1998\_\_. Resolution No. 98-037/118. Amendment to Santa Ana River Basin Plan, Establishes TMDL Standards for Nutrients and Sediments for Newport Bay/San Diego Creek Watershed.
- . 2000. Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (Phase 1 of the Inland Surface Waters Plan and the Enclosed Bays and Estuaries Plan).
- . 2000. Interim Policy on Land Use Controls Associated With Environmental Restoration Activities. Memorandum. 31 August.
- Department of the Navy. 1995. Memorandum concerning agree-to-disagree language, addressed to John Richards, Counsel for the California State Water Resources Control Board from Rex Callaway, DON Associate Counsel (Environmental). 22 September.
- . 2000. Memorandum of Agreement Between the United States Department of the Navy and the California [Environmental Protection Agency] Department of Toxic Substances Control. Signed 10 March 2000.
- DoD. *See* Department of Defense.
- DON. *See* Department of the Navy.
- DTSC. *See* California Environmental Protection Agency Department of Toxic Substances Control.
- Executive Order No. 11988, Floodplain Management. 24 May 1977.
- Executive Order No. 11990, Protection of Wetlands. 24 May 1977.
- Federal Emergency Management Agency floodplain maps.
- Federal Register*.
- RWQCB. *See* California Regional Water Quality Control Board.
- SCAQMD. *See* South Coast Air Quality Management District.
- South Coast Air Quality Management District. 1988. Policy on Implementation of Rule 1303.  
<http://www.aqmd.gov/rules/html/r1303.html>
- SWDIV. *See* Southwest Division Naval Facilities Engineering Command.
- SWRCB. *See* California State Water Resources Control Board.
- United States Department of Navy. 1997. Memorandum of Agreement between the United States Department of the Navy and the California Department of Toxic Substances Control. March.
- . 1988a. CERCLA Compliance With Other Laws Manual, Draft Guidance. EPA/540/G-89/006, Office of Emergency and Remedial Response, Washington, DC. August.
- . 1988b. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA. OSWER Directive 9355.3-01, -02. EPA/540/G-89/004. October.
- . 1989a. CERCLA Compliance With Other Laws Manual: Part II – Clean Air Act and Other Environmental Statutes and State Requirements, EPA/540/G-89/009, OSWER Directive 9234.1-02, Office of Solid Waste and Emergency Response, Washington, DC. August.
- . 1989b. Memorandum, Subject: Land Disposal Restrictions as Relevant and Appropriate Requirements for CERCLA Contaminated Soil and Debris, OSWER Directive No. 9347.2-01, Office of Solid Waste and Emergency Response. June.
- . 1989\_. Determining When Land Disposal Restrictions Are Applicable to Response Actions. OSWER Directive 9347.3-05FS. July.
- . 1990a. National Ambient Air Quality Standards (NAAQS).
- . 1991a. Management of Investigation-Derived Wastes During Site Inspections. EPA/540/G-91/009. May.

———. 1991b. ARARs Q's and A's: General Policy, RCRA, CWA, SDWA, Post-ROD Information, and Contingent Waivers. OSWER Directive No. 9234.2-01/FS-A, Washington, DC. June.  
USACE. *See* United States Army Corps of Engineers.  
U.S. EPA. *See* United States Environmental Protection Agency.  
U.S. EPA and USACE. *See* United States Environmental Protection Agency and United States Army Corps of Engineers.

## Regulation Websites

### General

General California regulations. <http://www.calregs.com/>.  
General California laws/statutes. <http://www.leginfo.ca.gov/calaw.html>.  
General federal regulations. <http://www.access.gpo.gov/nara/cfr/cfr-table-search.html>.  
General federal laws/statutes. <http://www4.law.cornell.edu/uscode/>.

### Specific

AQMD/APCD Rule 1401. <http://www.aqmd.gov/rules/html/r1401.html>  
Bay Area Air Quality Management District (Regulations). <http://www.baaqmd.gov/regs/rulereg.htm>  
Cal. Civ. Code §1471 (Transfer of Obligations). <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=civ&group=01001-02000&file=1457-1471>  
Cal. Code Regs. Title 14, §§670.2, 670.5 (Plants of California Declared to Be Endangered, Threatened or Rare/Animals of California Declared to Be Endangered or Threatened). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=243561&E22=title%2014&E23=670.2&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={694C2}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=243561&E22=title%2014&E23=670.2&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={694C2}&softpage=Browse_Frame_Pg42)  
Cal Code Regs. Title 14, §§10110 et seq. (San Francisco Bay Conservation and Development Commission – Purpose of Regulations). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=243585&E22=title%2014&E23=10110&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={735B9}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=243585&E22=title%2014&E23=10110&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={735B9}&softpage=Browse_Frame_Pg42)  
Cal. Code Regs. Title 14, §§13001–13666.4 (California Coastal Commission). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=243512&E22=title%2014&E23=13001&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={74727}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=243512&E22=title%2014&E23=13001&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={74727}&softpage=Browse_Frame_Pg42)  
Cal. Code Regs. Title 22, div. 4.5 (Environmental Health Standards for the Management of Hazardous Waste). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=200696&infobase=ccr&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=200696&infobase=ccr&softpage=Browse_Frame_Pg42)  
\*\*\*\*Cal. Code Regs. Title 22, app. IX, div. 4.5, ch. 14 (Standards for Owners and Operators of Hazardous Waste Transfer, Treatment, Storage, and Disposal Facilities). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=315811&infobase=ccr&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=315811&infobase=ccr&softpage=Browse_Frame_Pg42)  
Cal. Code Regs. Title 22, §66261.3 (Definition of Hazardous Waste). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=242572&E22=title%2022&E23=66261.3&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BC01A}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=242572&E22=title%2022&E23=66261.3&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BC01A}&softpage=Browse_Frame_Pg42)  
Cal. Code Regs. Title 22, §66261.21–.24 (Characteristics of Hazardous Wastes). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=200734&E22=title%2022&E23=66261.21&E24=&infobase=ccr&query](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=200734&E22=title%2022&E23=66261.21&E24=&infobase=ccr&query)

- [template=%261.%20Go%20to%20a%20Specific%20Section&record={BBD37}&softpage=Browse Frame Pg42](#)
- Cal. Code Regs. Title 22, §66261.30–33 (Lists of RCRA Hazardous Wastes – General). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=202457&E22=title%2022&E23=66261.30&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BBDA3}&softpage=Browse Frame Pg42](#)
- Cal. Code Regs. Title 22, §66261.100 (RCRA Hazardous Waste). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=249452&E22=title%2022&E23=66261.100&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BC2B6}&softpage=Browse Frame Pg42](#)
- Cal. Code Regs. Title 22, §66261.101 (Non-RCRA Hazardous Waste). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=242592&E22=title%2022&E23=66261.101&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BC2C4}&softpage=Browse Frame Pg42](#)
- Cal. Code Regs. Title 22, §66262.10 (Standards Applicable to Generators of Hazardous Waste – Purpose, Scope, and Applicability). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=242784&E22=title%2022%20&E23=66262.10&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BC461}&softpage=Browse Frame Pg42](#)
- Cal. Code Regs. Title 22, §66262.11 (Standards Applicable to Generators of Hazardous Waste – Hazardous Waste Determination). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=242875&E22=title%2022&E23=66262.11&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BC479}&softpage=Browse Frame Pg42](#)
- Cal. Code Regs. Title 22, §66262.30–.33 (Standards Applicable to Generators of Hazardous Waste – Packaging, Labeling, Marking, Placarding). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=242879&E22=title%2022&E23=66262.30&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BC4DC}&softpage=Browse Frame Pg42](#)
- Cal. Code Regs. Title 22, §66262.34 (Accumulation Time). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=1067406&E22=title%2022&E23=66262.34&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BC089}&softpage=Browse Frame Pg42](#)
- Cal. Code Regs. Title 22, §66264.13(a), (b) (General Waste Analysis). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=242983&E22=title%2022&E23=66264.13&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BC9DD}&softpage=Browse Frame Pg42](#)
- Cal. Code Regs. Title 22, §66264.14 (Standards for Owners and Operators of Hazardous Waste Transfer, Treatment, Storage, and Disposal Facilities – Security). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=324074&E22=title%2022&E23=66264.14&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BCC40}&softpage=Browse Frame Pg42](#)
- Cal. Code Regs. Title 22, §66264.18 (a), (b), (c) (Standards for Owners and Operators of Hazardous Waste Transfer, Treatment, Storage, and Disposal Facilities – Location Standards). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=242586&E22=title%2022&E23=66264.18&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BCA58}&softpage=Browse Frame Pg42](#)
- Cal. Code Regs. Title 22, §66264.94 (Concentration Limits). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=1082015&E22=title%2022&E23=66264.94&E24=&infobase=ccr&query](#)

- [ytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BC7B4}&softpage=Browse\\_Frame\\_Pg42](#)
- Cal. Code Regs. Title 22, §66264.111 (Closure Performance Standard). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=1067489&E22=title%2022&E23=66264.111&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BC908}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=1067489&E22=title%2022&E23=66264.111&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BC908}&softpage=Browse_Frame_Pg42)
- Cal. Code Regs. Title 22, §66264.114 (Disposal or Decontamination of Equipment, Structures and Soils). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=249825&E22=title%2022&E23=66264.114&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BCDFB}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=249825&E22=title%2022&E23=66264.114&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BCDFB}&softpage=Browse_Frame_Pg42)
- Cal. Code Regs. Title 22, §66264.171–178 (Use and Management of Containers). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=1067498&E22=title%2022&E23=66264.171&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BCC1E}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=1067498&E22=title%2022&E23=66264.171&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BCC1E}&softpage=Browse_Frame_Pg42)
- Code Regs. Title 22, §66264.193 (Tank Systems – Containment and Detection of Releases). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=249833&E22=title%2022&E23=66264.193&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BD1BC}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=249833&E22=title%2022&E23=66264.193&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BD1BC}&softpage=Browse_Frame_Pg42)
- Cal. Code Regs. Title 22, §66264.250–.252, .258 (Waste Piles). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=1067573&E22=title%2022&E23=66264.250&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BCFA0}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=1067573&E22=title%2022&E23=66264.250&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BCFA0}&softpage=Browse_Frame_Pg42)
- Cal. Code Regs. Title 22, §66264.271, .273 (Land Treatment – Treatment Program, Design and Operating Requirements). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=250372&E22=title%2022&E23=66264.271&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BD4E2}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=250372&E22=title%2022&E23=66264.271&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BD4E2}&softpage=Browse_Frame_Pg42)
- Cal. Code Regs. Title 22, §66264.278 (Vadose Zone Monitoring and Response). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=250353&E22=title%2022&E23=66264.278&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BD537}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=250353&E22=title%2022&E23=66264.278&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BD537}&softpage=Browse_Frame_Pg42)
- Cal. Code Regs. Title 22, §66264.280 (Land Treatment – Closure and Postclosure Care). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=250358&E22=title%2022&E23=66264.280&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BD571}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=250358&E22=title%2022&E23=66264.280&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BD571}&softpage=Browse_Frame_Pg42)
- Cal. Code Regs. Title 22, §66264.301 (Landfills – Design and Operating Requirements). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=250437&E22=title%2022&E23=66264.301&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BD5C6}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=250437&E22=title%2022&E23=66264.301&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BD5C6}&softpage=Browse_Frame_Pg42)
- Cal. Code Regs. Title 22, §66264.553 (Temporary Units). [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=1067639&E22=title%2022&E23=66264.553%20&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BD355}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=1067639&E22=title%2022&E23=66264.553%20&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BD355}&softpage=Browse_Frame_Pg42)
- Cal. Code Regs. Title 22, §66264.601 (Environmental Performance Standards). <http://www.calregs.com/cgi->

- [bin/om\\_isapi.dll?clientID=250470&E22=title%2022&E23=66264.601&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BD87C}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=250470&E22=title%2022&E23=66264.601&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BD87C}&softpage=Browse_Frame_Pg42)
- Cal. Code Regs. Title 22, §66268.1 (Land Disposal Restrictions Purpose, Scope and Applicability).** [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=1082062&E22=title%2022&E23=66268.1&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BF6DF}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=1082062&E22=title%2022&E23=66268.1&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BF6DF}&softpage=Browse_Frame_Pg42)
- Cal. Code Regs. Title 22, §66268.30, .31 (Waste-Specific Prohibitions – Wood-Preserving Wastes, Dioxin-Containing Wastes).** [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=250644&E22=title%2022&E23=66268.30&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BFE6C}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=250644&E22=title%2022&E23=66268.30&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BFE6C}&softpage=Browse_Frame_Pg42)
- Cal. Code Regs. Title 22, §66268.40 (Land Disposal Restrictions – Applicability of Treatment Standards).** [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=249092&E22=title%2022&E23=66268.40&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BFF53}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=249092&E22=title%2022&E23=66268.40&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BFF53}&softpage=Browse_Frame_Pg42)
- Cal. Code Regs. Title 22, §66268.42 (Treatment Standards Expressed As Specified Technologies).** [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=250663&E22=title%2022&E23=66268.42&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BFFBE}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=250663&E22=title%2022&E23=66268.42&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={BFFBE}&softpage=Browse_Frame_Pg42)
- Cal. Code Regs. Title 22, §66268.48 (Universal Treatment Standards).** [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=249136&E22=title%2022&E23=66268.48&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={C003F}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=249136&E22=title%2022&E23=66268.48&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={C003F}&softpage=Browse_Frame_Pg42)
- Cal. Code Regs. Title 22, §66268.105 (Treatment Standards – Non-RCRA Waste Categories – Applicability of Treatment Standards).** [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=250680&E22=title%2022&E23=66268.105&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={C00A9}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=250680&E22=title%2022&E23=66268.105&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={C00A9}&softpage=Browse_Frame_Pg42)
- Cal. Code Regs. Title 23, div. 3, ch. 15 (Discharges of Hazardous Waste to Land).** [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=202501&E22=title%2023&E23=2510&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={D6507}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=202501&E22=title%2023&E23=2510&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={D6507}&softpage=Browse_Frame_Pg42)
- Cal. Code Regs. Title 23, §§2542, 2543 (Construction Standards – Liners/Leachate Collection and Removal Systems).** [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=1067821&E22=title%2023&E23=2542&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={D65FA}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=1067821&E22=title%2023&E23=2542&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={D65FA}&softpage=Browse_Frame_Pg42)
- Cal. Code Regs. Title 27, div. 2, subdiv. 1 (Consolidated Regulations for Treatment, Storage, Processing or Disposal of Solid Waste).** [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=202535&E22=title%2027&E23=20005&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={E4410}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=202535&E22=title%2027&E23=20005&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={E4410}&softpage=Browse_Frame_Pg42)
- Cal. Code Regs. Title 27, §20210 (SWRCB – Designated Waste).** [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=202567&E22=title%2027&E23=20210&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={E45FD}&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=202567&E22=title%2027&E23=20210&E24=&infobase=ccr&querytemplate=%261.%20Go%20to%20a%20Specific%20Section&record={E45FD}&softpage=Browse_Frame_Pg42)



- Cal. Code Regs. Title 27, §20220 (SWRCB – Nonhazardous Solid Waste).** [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=205075&E22=title%2027&E23=20220&E24=&infobase=ccr&querytmplate=%261.%20Go%20to%20a%20Specific%20Section&record={E4608}&softpage=BrowseFrame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=205075&E22=title%2027&E23=20220&E24=&infobase=ccr&querytmplate=%261.%20Go%20to%20a%20Specific%20Section&record={E4608}&softpage=BrowseFrame_Pg42)
- Cal. Code Regs. Title 27, §20230 (SWRCB – Inert Waste).** [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=205077&E22=title%2027&E23=20230&E24=&infobase=ccr&querytmplate=%261.%20Go%20to%20a%20Specific%20Section&record={E461A}&softpage=BrowseFrame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=205077&E22=title%2027&E23=20230&E24=&infobase=ccr&querytmplate=%261.%20Go%20to%20a%20Specific%20Section&record={E461A}&softpage=BrowseFrame_Pg42)
- Cal. Code Regs. Title 27, §§20380 (SWRCB – Applicability).** [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=250771&E22=title%2027&E23=20380&E24=&infobase=ccr&querytmplate=%261.%20Go%20to%20a%20Specific%20Section&record={E4BF7}&softpage=BrowseFrame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=250771&E22=title%2027&E23=20380&E24=&infobase=ccr&querytmplate=%261.%20Go%20to%20a%20Specific%20Section&record={E4BF7}&softpage=BrowseFrame_Pg42)
- Cal. Code Regs. Title 27, §§20385 (SWRCB –Required Programs).** [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=250774&E22=title%2027&E23=&E24=20385&infobase=ccr&querytmplate=%261.%20Go%20to%20a%20Specific%20Section&record={E4C03}&softpage=BrowseFrame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=250774&E22=title%2027&E23=&E24=20385&infobase=ccr&querytmplate=%261.%20Go%20to%20a%20Specific%20Section&record={E4C03}&softpage=BrowseFrame_Pg42)
- Cal. Code Regs. Title 27, §20400 (SWRCB – Concentration limits).** [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=205092&E22=title%2027&E23=20400&E24=&infobase=ccr&querytmplate=%261.%20Go%20to%20a%20Specific%20Section&record={E47B5}&softpage=BrowseFrame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=205092&E22=title%2027&E23=20400&E24=&infobase=ccr&querytmplate=%261.%20Go%20to%20a%20Specific%20Section&record={E47B5}&softpage=BrowseFrame_Pg42)
- Cal. Code Regs. Title 27, §20430 (SWRCB – Corrective Action Program).** [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=638873&E22=title%2027&E23=20430&E24=&infobase=ccr&querytmplate=%261.%20Go%20to%20a%20Specific%20Section&record={E4D48}&softpage=BrowseFrame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=638873&E22=title%2027&E23=20430&E24=&infobase=ccr&querytmplate=%261.%20Go%20to%20a%20Specific%20Section&record={E4D48}&softpage=BrowseFrame_Pg42)
- Cal. Code Regs. Title 27, §20950 (SWRCB – General Closure and Postclosure Maintenance Standards Applicable to Waste Management Units for Solid Waste).** [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=638912&E22=title%2027&E23=20950&E24=&infobase=ccr&querytmplate=%261.%20Go%20to%20a%20Specific%20Section&record={E50B8}&softpage=BrowseFrame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=638912&E22=title%2027&E23=20950&E24=&infobase=ccr&querytmplate=%261.%20Go%20to%20a%20Specific%20Section&record={E50B8}&softpage=BrowseFrame_Pg42)
- Cal. Code Regs. Title 27, §21090 (SWRCB – Closure and Post-Closure Maintenance Requirements for Solid Waste Landfills).** [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=638932&E22=title%2027&E23=21090&E24=&infobase=ccr&querytmplate=%261.%20Go%20to%20a%20Specific%20Section&record={E50DA}&softpage=BrowseFrame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=638932&E22=title%2027&E23=21090&E24=&infobase=ccr&querytmplate=%261.%20Go%20to%20a%20Specific%20Section&record={E50DA}&softpage=BrowseFrame_Pg42)
- Cal. Code Regs. Title 27, §21769 (SWRCB – Closure and Postclosure Maintenance Plan Requirements).** [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=638967&E22=title%2027&E23=21769&E24=&infobase=ccr&querytmplate=%261.%20Go%20to%20a%20Specific%20Section&record={E54D7}&softpage=BrowseFrame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=638967&E22=title%2027&E23=21769&E24=&infobase=ccr&querytmplate=%261.%20Go%20to%20a%20Specific%20Section&record={E54D7}&softpage=BrowseFrame_Pg42)
- Cal. Fish & Game Code §1750 (Native Species Conservation and Enhancement Act).** <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=fgc&group=01001-02000&file=1750>
- Cal. Fish & Game Code §1801 (Conservation of Wildlife Resources).** <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=fgc&group=01001-02000&file=1801-1802>
- Cal. Fish & Game Code §§1900, 1908 (Native Plant Protection).** <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=fgc&group=01001-02000&file=1900-1913>
- Cal. Fish & Game Code §2014 (Taking and Possessing in General).** <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=fgc&group=01001-02000&file=2000-2020>

Cal. Fish & Game Code ch. 1.5, §§2050–2116 (California Endangered Species Act).  
<http://www.leginfo.ca.gov/cgi-bin/waisgate?WAIISdocID=3198110612+1+0+0&WAIISaction=retrieve>

Cal. Fish & Game Code §3005(a) (Birds and Mammals – Methods of Taking).  
<http://www.leginfo.ca.gov/cgi-bin/displaycode?section=fgc&group=02001-03000&file=3000-3012>

Cal. Health & Safety Code §25157.8 (State Regulation of Existing Hazardous Waste Facilities – Standards). <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=hsc&group=25001-26000&file=25150-25158.4>

Cal. Health & Safety Code §25202.5 (Hazardous Waste Control – Permitting of Facilities).  
<http://www.leginfo.ca.gov/cgi-bin/displaycode?section=hsc&group=25001-26000&file=25200-25205>

Cal. Health & Safety Code §25208 (Toxic Pits Cleanup Act of 1984). <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=hsc&group=25001-26000&file=25208-25208.17>

Cal. Health & Safety Code §§25222.1, 25232(b)1(A)–(E), 25233(c) (Hazardous Waste Disposal Land Use). <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=hsc&group=25001-26000&file=25220-25241>

Cal. Health & Safety Code div. 20, ch. 6.6.7, §25270–25270.13 (). *Host is unreachable*

Cal. Health & Safety Code §41700, 41701 (). *Host is unreachable*

California Air District Resource Directory. <http://www.arb.ca.gov/capcoa/roster.htm>

California Air Resources Board (District Rules Database). <http://www.arb.ca.gov/drdb/drdb.htm>

Pub. Res. Code div. 13 §15000, 15002 (). *Host is unreachable*

Cal. Pub. Res. Code div. 13 §21000–21178 (California Environmental Quality Act).  
<http://www.leginfo.ca.gov/cgi-bin/displaycode?section=prc&group=20001-21000&file=21000-21006>

Cal. Water Code §1243 (). *Host is unreachable*

Cal. Water Code div. 7 (Porter-Cologne Water Quality Control Act). <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=wat&group=12001-13000&file=13000-13002>

Cal. Water Code §§13140, 13142.5 (Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California??). *Host is unreachable*

Cal. Water Code §13000 (). *Host is unreachable*

Cal. Water Code §§13263, 13269 (Waste Discharge Requirements). <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=wat&group=13001-14000&file=13260-13274>

Cal. Water Code §13304 (Administrative Enforcement and Remedies by Regional Boards).  
<http://www.leginfo.ca.gov/cgi-bin/displaycode?section=wat&group=13001-14000&file=13300-13308>

Cal. Water Code §13307 (02 Oct 1996?). *Host is unreachable*

40 CFR §6.301(a), (b), (c) (Landmarks, Historical and Archeological Sites).  
<http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=40&PART=6&SECTION=301&YEAR=2000&TYPE=TEXT>

40 CFR §6.302(a), (b) (Exec. Order No. 11988, Protection of Floodplains; Exec. Order No. 11990, Protection of Wetlands). <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=40&PART=6&SECTION=302&YEAR=2000&TYPE=TEXT>

40 CFR pt. 6, app. A (Procedures for Implementing the Requirements of the Council on Environmental Quality on the National Environmental Policy Act).  
[http://www.access.gpo.gov/nara/cfr/waisidx\\_00/40cfr6\\_00.html](http://www.access.gpo.gov/nara/cfr/waisidx_00/40cfr6_00.html)

40 CFR §50.4–.12 (National Ambient Air Quality Standards).  
[http://www.access.gpo.gov/nara/cfr/waisidx\\_00/40cfr50\\_00.html](http://www.access.gpo.gov/nara/cfr/waisidx_00/40cfr50_00.html)

40 CFR pt. 257 (Criteria for Classification of Solid Waste Disposal Facilities and Practices).  
<http://www.epa.gov/docs/epacfr40/chapt-I.info/subch-I/40P0257.pdf>

- 40 CFR pt. 261 (Identification and Listing of Hazardous Waste). [http://www.access.gpo.gov/nara/cfr/waisidx\\_00/40cfr261\\_00.html](http://www.access.gpo.gov/nara/cfr/waisidx_00/40cfr261_00.html)
- 40 CFR §261.4 (Identification and Listing of Hazardous Waste – Exclusions). <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=40&PART=261&SECTION=4&YEAR=2000&TYPE=TEXT>
- 40 CFR §261.21–.24 (Identification and Listing of Hazardous Waste – Characteristics of Ignitability, Corrosivity, Reactivity, and Toxicity). <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=40&PART=261&SECTION=21&YEAR=2000&TYPE=TEXT>
- 40 CFR §264.554 (Staging Piles). <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=40&PART=264&SECTION=554&YEAR=2000&TYPE=TEXT>
- 40 CFR pt. 266 subpt. M (Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities ). <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=40&PART=266&SECTION=200&YEAR=2000&TYPE=TEXT>
- 40 CFR pt. 268.2 (Land Disposal Restrictions – Definitions). <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=40&PART=268&SECTION=2&YEAR=2000&TYPE=TEXT>
- 40 CFR §761.40 (PCBs – Marking Requirements). <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=40&PART=761&SECTION=40&YEAR=2000&TYPE=TEXT>
- 40 CFR §761.45 (PCBs – Marking Formats). <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=40&PART=761&SECTION=45&YEAR=2000&TYPE=TEXT>
- 40 CFR §761.50 (PCBs – Storage and Disposal –Applicability). <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=40&PART=761&SECTION=50&YEAR=2000&TYPE=TEXT>
- 40 CFR §761.60 (PCBs – Disposal Requirements). <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=40&PART=761&SECTION=60&YEAR=2000&TYPE=TEXT>
- 40 CFR §761.61(a). (PCB Remediation Waste) [http://www.access.gpo.gov/nara/cfr/waisidx\\_00/40cfr761\\_00.html](http://www.access.gpo.gov/nara/cfr/waisidx_00/40cfr761_00.html)
- 40 CFR §761.65 (PCBs – Storage for Disposal). <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=40&PART=761&SECTION=65&YEAR=2000&TYPE=TEXT>
- 40 CFR §761.79 (PCBs – Decontamination Standards and Procedures). <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=40&PART=761&SECTION=79&YEAR=2000&TYPE=TEXT>
- 40 CFR §761.120 (PCB Spill Cleanup Policy – Scope). <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=40&PART=761&SECTION=120&YEAR=2000&TYPE=TEXT>
- 40 CFR §761.123 (PCB Spill Cleanup Policy – Definitions). <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=40&PART=761&SECTION=123&YEAR=2000&TYPE=TEXT>
- 40 CFR §761.125 (Requirements for PCB Spill Cleanup). <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=40&PART=761&SECTION=125&YEAR=2000&TYPE=TEXT>
- 40 CFR §761.130 (PCB Spill Cleanup Policy – Sampling Requirements). <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=40&PART=761&SECTION=130&YEAR=2000&TYPE=TEXT>
- 49 CFR §171.2 (Research and Special Programs Administration, Department of Transportation – General Regulations) . <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=49&PART=171&SECTION=2&TYPE=TEXT>
- 50 CFR §10.13 (List of Migratory Birds). <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=50&PART=10&SECTION=13&YEAR=1999&TYPE=TEXT>
- 50 CFR pt. 27 (Wildlife and Fisheries – United States Fish and Wildlife Service, Department of the Interior – Prohibited Acts). [http://www.access.gpo.gov/nara/cfr/waisidx\\_99/50cfr27\\_99.html](http://www.access.gpo.gov/nara/cfr/waisidx_99/50cfr27_99.html)
- 50 CFR §27.11–27.97 (National Wildlife Refuge System Administration Act of 1996). <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=50&PART=27&SECTION=11&YEAR=1999&TYPE=TEXT>
- 50 CFR §35.1–.14 (Wilderness Act). [http://www.access.gpo.gov/nara/cfr/waisidx\\_99/50cfr35\\_99.html](http://www.access.gpo.gov/nara/cfr/waisidx_99/50cfr35_99.html)



50 CFR §402 (Interagency Cooperation – Endangered Species Act of 1973, as amended).  
[http://www.access.gpo.gov/nara/cfr/waisidx\\_00/50cfr402\\_00.html](http://www.access.gpo.gov/nara/cfr/waisidx_00/50cfr402_00.html)

Executive Order 11988 Floodplain Management.  
<http://www.ecy.wa.gov/programs/sea/grants/fedexorder.htm>

Protection of Wetlands, Executive Order 11990 of 1977.  
<http://www.ecy.wa.gov/programs/sea/grants/fedexorder.htm>

40 Fed. Reg. 6030 (10 February 1968).  
 55 Fed. Reg. 8666, 8764–8765 (1990) (NCP preamble).  
 56 Fed. Reg. 3572–3573 (1991).  
 57 Fed. Reg. 32726 (23 July 1992) (Notice approving California RCRA hazardous waste management program).

MOJAQMD Rule 402. <http://www.arb.ca.gov/DRDB/MOJ/CURHTML/R402.HTM>

Monterey Bay Unified Air Pollution Control District (List of Current Rules).  
<http://www.arb.ca.gov/drdb/mbu/cur.htm>

National Environmental Policy Act. <http://ceq.eh.doe.gov/nepa/regs/nepa/nepaeqia.htm>

National Register of Historic Places. <http://tps.cr.nps.gov/nhl/result.cfm>

Pub. L. No. 96-95 (Archaeological Resources Protection Act of 1979, as amended).  
<http://exchanges.state.gov/education/culprop/96-95.html>

RWQCB (all regions). <http://www.swrcb.ca.gov/rwqcb/index.html>

15 USC, ch. 53, §§2601–2692 (Toxic Substances Control Act).  
<http://www4.law.cornell.edu/uscode/15/2601.html>

16 USC ch. 1A §§461–467 (Historic Sites, Buildings, and Antiquities Act of 1935). <http://www4.law.cornell.edu/uscode/16/ch1A.html>

16 USC §469–469c-1 (Archaeological and Historic Preservation Act).  
<http://www4.law.cornell.edu/uscode/16/469.html>

16 USC §470aa–470mm (Archaeological Resources Protection Act of 1979, as amended).  
<http://www4.law.cornell.edu/uscode/16/ch1B.html>

16 USC ch. 1B §470–470x-6 (National Historic Preservation Act). <http://www4.law.cornell.edu/uscode/16/470.html>

16 USC §§661–666c (Protection and Conservation of Wildlife – Game, Fur-Bearing Animals, and Fish). <http://www4.law.cornell.edu/uscode/16/661.html>

16 USC §668dd–ee (National Wildlife Administration Act of 1996/National Wildlife Refuge System). <http://www4.law.cornell.edu/uscode/16/668dd.html>

16 USC ch. 5A, subch. I §662 (Fish and Wildlife Coordination Act).  
<http://www4.law.cornell.edu/uscode/16/662.html>

16 USC § 703–712 (Migratory Bird Treaty Act of 1972).  
<http://www4.law.cornell.edu/uscode/16/703.html>

16 USC §§1131–1136 (Wilderness Act – National Wilderness Preservation System).  
<http://www4.law.cornell.edu/uscode/16/ch23.html>

16 USC §§1531–1543 Endangered Species Act of 1973).  
<http://www4.law.cornell.edu/uscode/16/ch35.html>

16 USC §1536(a), (h)(1)(B) (Endangered Species Act of 1973 – Interagency Cooperation).  
<http://www4.law.cornell.edu/uscode/16/1536.html>

42 USC, ch. 82, §§6901–6991(i) (Resource Conservation and Recovery Act).  
<http://www4.law.cornell.edu/uscode/42/6901.html>

42 USC, ch. 85, §§7401–7671 (Clean Air Act). <http://www4.law.cornell.edu/uscode/42/7401.html>

42 USC, ch.103, §§9601–9675 (Comprehensive Environmental Response, Compensation, and Liability Act). <http://www4.law.cornell.edu/uscode/42/9601.html>

42 USC § 9604 (Comprehensive Environmental Response, Compensation, and Liability Act – Response Authorities). <http://www4.law.cornell.edu/uscode/42/9604.html>

**42 USC §9621(d) (Comprehensive Environmental Response, Compensation, and Liability Act – Cleanup Standards).** <http://www4.law.cornell.edu/uscode/42/9621.html>  
**49 USC §§5101–5127 (Transportation of Hazardous Material).**  
<http://www4.law.cornell.edu/uscode/49/5101.html>